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CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

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YUGOSLAVIA UDC 681.3.39.001.8

MICROPROCESSORS AND THE POSSIBILITIES FOR THEIR PRODUCTION AND USE IN YUGOSLAVIA

Zagreb AUTOMATIKA in Croatian No 1-2, 1977 pp 3-14

SMILJANIC, GABRO, Professor at the School of Electrotechnology, Zagreb

[Abstract] The article presents a summary of the history, development, structure, and leading producers of microprocessors or calculators, showing that the leading role in progress has been in the United States, Japan, and Western Europe. The state of developments in Yugoslavia is summarized and shown to be at a very dependent level. At best, components are imported and assembled, but more often complete products are obtained and sold. Those microcomputers assembled in Yugoslavia are related to foreign licenses. Technology lags so much that, if it were to develop at the same rate in Yugoslavia as in the western world, the first domestic hardware could be produced only about 1992. Such a rate of technological development is not expected. Only a ready world market could encourage it, which has happened only in the case of ELAN skiis for Yugoslav products. No significant production should be expected within the next 15 years. Use of such microcomputers also presents problems, because necessary support and service capacities are lacking, but at least one firm, Elektronika of Zagreb, is marketing microcomputer systems. Development of domestic technology and personnel should be encouraged instead of continued reliance on licenses from foreign countries. Figures 2; tables 4; references 79: 7 Yugoslav; 72 Western.

USSR UDC 621.3.48./14

MICROPROCESSORS BASED ON READ-ONLY MEMORY

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977 pp 64-70
manuscript received 26 Apr 77

GLUSHKOV, VIKTOR MIKHAYLOVICH, academician, IK AN USSR [Cybernetics Institute, Academy of Sciences, UkrSSR] (Kiev); DERKACH, VITALIY PAVLOVICH, dr in technical sciences, IK AN USSR (Kiev); KORSUNSKIY, VLADIMIR MONSEYEVICH, candidate in technical sciences, IK AN USSR (Kiev) and KHACHATRYAN, VASILIY BENIKOVICH, engineer, IK AN USSR (Kiev)

[Abstract] The possibility is considered of constructing inexpensive high-speed specialized devices for computing techniques from made-to-order, programmable or reprogrammable microprocessors based on read-only memory [PZU]. The advisability is shown of including such microprocessors in the makeup of the fundamental base of digital computing systems of the fourth generation. It is necessary to solve the following scientific-technical problems in order to create the scientific basis of production and wide use of processors of the type indicated: 1) To develop methods and engineer procedures for optimum decomposition of a complex automat by microprocessors, where it is possible to take productivity and the number of microprocessors used as the criterion of optimization; 2) To produce efficient schemes for the internal organization of microprocessors, leading to a widening of their functional possibilities without a significant increase of the crystal area; 3) To validate efficient nomenclature for microwave processors based on read-only memory, and providing large batch production to them with preservation of the necessary flexibility of planning; and 4) To develop efficient methods of programming and reprogramming microprocessors by the users. Figures 9; tables 2; references 11: 6 Russian, 5 Western.

USSR

GLUSHKOV ON THE INFORMATION PROCESSING INDUSTRY

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian ["The Information Processing Industry"] No 5, Sep/Oct 77 pp 3-6

GLUSHKOV, V.

[Abstract] A recent issue of the journal UPRAVLYAYUSHCHIYE SISTEMY I MASHINY [Control Systems and Machines] contained an article on problems in and prospects for the computer industry by Academician Viktor M. Glushkov, editor-in-chief of the journal and director of the Institute of Cybernetics,

Academy of Sciences UkrSSR. The article is a slightly condensed version of an article that appeared in the journal KOMMUNIST No 12, 1977, pp 43-53, [translated in JPRS 69872, 28 Sep 77].

USSR

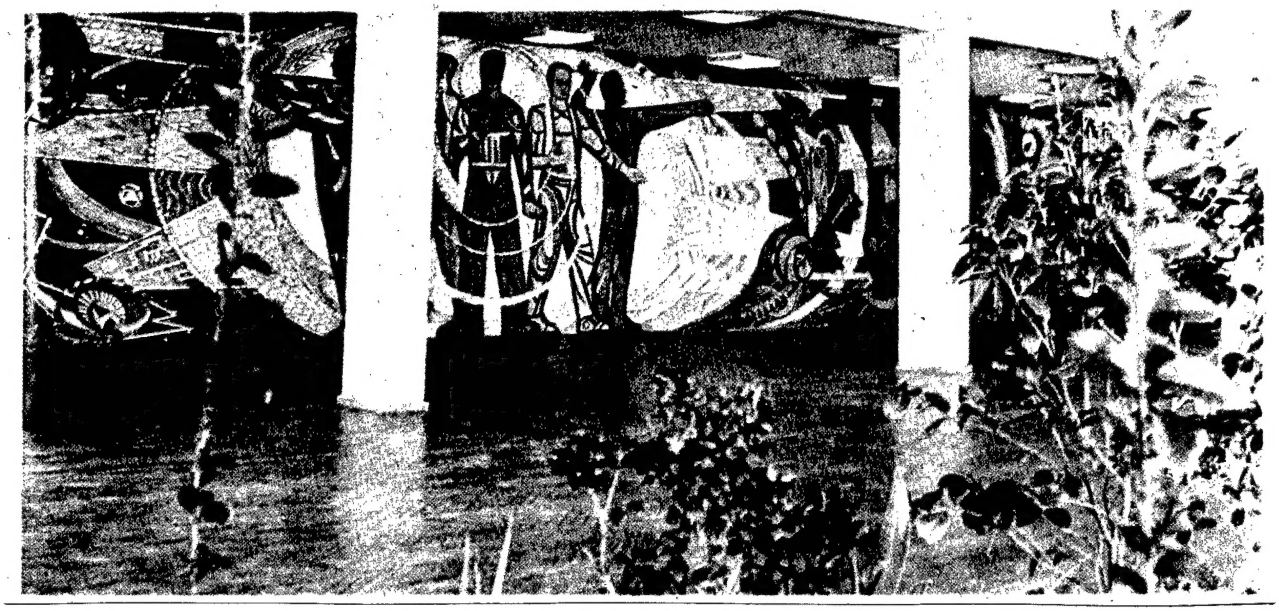
GROWTH OF CYBERNETICS CENTER, ACADEMY OF SCIENCES, UkrSSR

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian["Kiev, Teremki"] No 6, Nov-Dec 1977 inside back cover

[Text] In the year of the 50th anniversary of the Great October Revolution, in the southern outskirts of Kiev, in Teremki, builders excavated the first cubic meters of ground for the foundation of the future Cybernetics Center of the Academy of Sciences, UkrSSR. The VLKSM [All-Union Lenin Communist Youth League] Central Committee declared the site an all-Union urgent Komsomol construction site.

Inside front cover phogograph: In One of the Shops of the Experimental Plant

Inside back cover photograph (top):
Administration Building



Inside back cover photograph (bottom): Interior of the Foyer of the First Floor of this Building

In 10 years a desert measuring 44 hectares in area has been transformed. An administration and 9 laboratory buildings have sprung up, as well as 4 residential buildings, a school seating 1176 students, a comprehensive school for 280 children, an ATS automatic telephone exchange to handle 20,000 calls, and scores of auxiliary engineering structures. Construction

is continuing on a group of buildings for an experimental microelectronics plant and on residential buildings. At the disposal of scientists is one of the largest computer centers in the country, an experimental plant, a conference hall seating 1000, and a dining hall seating 300. In the planning stage are education and shopping centers and a sports complex.

HUNGARY

FEATURES OF TOMORROW'S COMPUTERS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 4-9

HOFFMANN, TIBOR, dr, department head, OMFB [National Technical Development Committee]

[Abstract] This article is the text of the author's lecture delivered at the 11-16 July 1977 conference on "Mathematics in the Service of Mankind," held in Barcelona, Spain. The computers of the future will be faster; this will be achieved by speeding up the individual operations and by performing several operations concurrently rather than sequentially. There will also be changes in the memories; however, they will represent improvements of the latest approaches rather than new principles. The spread of microprocessors revived computers operating on the basis of non-Neumann principles, using short and simple programs. The more efficient utilization of memory capacity is facilitated by combining two coordinates and the value of the matrix element into a single word. Non-null arithmetics, where operations are performed only with non-null values, will contribute further to the more efficient use of the memory. The so-called SIMPLICISSIMUS program type, where results are obtained directly, rather than by iteration, is also promising. The spreading of microcomputers brings up the problem of limited memory capacity. Here a major increase in capacity may be achieved by more rational storage of integer and real numbers. Selective printout will speed up the output and will make its handling more economical. The trend is to make computers usable by and useful for individuals without specialized training.

USSR UDC 681.3.003.1

STANDARDIZATION OF THE USE OF KIT PRODUCTS FOR COMPUTER ENGINEERING MEANS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 2, 1978 pp 55-56

GERASINA, G. V. and D'YAKOV, L. P., engineers

[Text] The standards group of the Ryazan' Technological Planning Institute (RPTI) has worked on discovering reserves for saving kit products [Komplektuyushchoe izdeliye] used in computer engineering means. In the total cost of the products of computer engineering means, the cost of the kit products is about 48 percent. In coming years the proportion of the kit products will increase; therefore the primary goal here is reduction of their consumption norms.

As a result of the analysis of the summary norms for the consumption of kit products at the plants of the VO [All-Union Association] "Soyuzschetmash" it was discovered that for identical products there are different norms. This indicates the poor substantiation of the existing norms. The summary norm is made up of the kit product consumption norm for tuning, adjustment and the process waste. One of the measures for ordering the consumption of the kit products is establishment of the substantiated percentage of the consumption for the technological process waste, the losses during the course of the installation and assembly operations, the selection and regulation.

In order to determine the maximum admissible percentage of losses during regulation, adjustment and the installation and assembly operations all of the computer engineering products were divided into groups with respect to purpose and structural peculiarities: the general purpose digital computers, the analog and analog-digital computers, the punch computer complex machines, the keyboard computers, the specialized computers, the control systems and machines for the production projects (the programming units; the machines for the mechanization of the control accounting and commercial financial operations (the cash registers); the kit units and equipment (the modules and devices for the ASVT [Aggregate System of Computer Engineering Means] complex); the standard units, circuits and elements (modules, units of elements of the ASVT complex, Varistors).

The summary norms for the consumption of the kit products were analyzed with respect to each of group of products and by plants. The basic work was done directly at the plants where the state of the normalization and reserves for nonliquid and supernormative remains of kit products were checked.

The procedure for analyzing the statistical data with respect to the actual consumption norms is as follows. Twice a year the kit product consumption norms are reexamined and agreed on. At RPTI, simultaneously with the summary norms, the plants present information on the actual consumption of kit

products in each group. The specialists of the institute have for several years analyzed the reference data, the demands for kit products by the norms and the actual consumption. The analysis demonstrates that there is under-consumption of the kit products at the plants, which is explained by the high norms for use of the technological waste and regulation. The analysis data were confirmed by the tests at the plant.

On going to the plants, the institute specialists performed a complete analysis of the movement of the kit products, beginning with the arrival of them at the warehouse and before sending to the shop and the installation section. The qualifications of the workers were taken into account. This survey material gave a proper idea of the use of the kit products with respect to the identical products of computer engineering. As a result of the work done it was established that at the plants there was no accounting for the actual consumption of the kit products for regulation and technological waste were established without considering the statistical data for the actual consumption from which the summary consumption norms were high, and large reserves of nonliquid and supernormative remains were formed at the plant warehouses.

In order to bring some order into establishment of the standards for the consumption of kit products for regulation and technological waste the RPTI specialists have recommended the establishment of a maximum number of kit products which fail as a result of their use when regulating and testing the products and percentages of the amount of the kit products entering into the system. These maximum consumption norms for regulation and technological waste were developed for the first time for the enterprises of the VO "Soyuzelektronschetmash" in 1969. In 1971 on the basis of analyzing the statistical data on the actual consumption, the maximum consumption norms for regulation and technological waste were decreased and again approved in the association. It was proposed that the plants reexamine the consumption norms for the kit products for regulation and technological waste in accordance with the approved maximum norms with respect to product groups.

In 1974 and 1975 the necessity arose for secondary reexamination of the consumption norms for the kit products for regulation and technological waste and recommendation of them for introduction at the plants of the VO Soyuzschetmash Association. All of the operations with respect to bringing order into the kit product consumption norms were performed on the basis of the deep analysis of the statistical data on the actual consumption norms and the recommendations of the plants and also considering the introduction at the plants of the advanced process of the assembly of the computer engineering means.

The systematic reexamination and reduction of the maximum kit product consumption norms for regulation and technological waste permitted us to obtain the following cost benefit with respect to the plants of the VO "Soyuzachetmash" Association in thousands of rubles.

1969	1970	1971	1972	1973	1974	1975	1976
280	354	194,23	85,353	61,197	47,951	144,6	148,3

The recommendations with respect to standardizing the kit product consumption are as follows: 1) it is recommended that the developers of the normative groups clearly monitor and analyze the movement of the kit products beginning with calculation of the demand for them and ending with the supply of them to the work area: 2) the kit products be sent for regulation and technological waste only on demand after the foreman or shop chief has signed for it and not by the limit cards; 3) in the case of overconsumption of kit products for regulation and technological waste the technically acceptable justification must be presented; 4) a plan must be compiled for the measures with respect to replacement of the expensive and short kit products for the newly mastered and for the series products of computer engineering by cheaper and less deficit ones; 5) the maximum consumption norms for regulation and technological waste be introduced by order by plant which will permit restriction of the application of the kit products and the reduction in their consumption norms.

USSR

NEW BOOKS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 2, 1978 pp 35, 57, 61 and 62

[Text] I. M. Vladovskiy, ASU PREDPRIYATIYEM NA BAZE YES EVM (Automated Enterprise Management System Based on the Unified System of Computers), Moscow, Energiya, 1977, 120 pages (Library on Automation, No 577), 15,000 copies, 50 kopeks.

The creation and the operation of the automated enterprise management system based on the unified system of computers are discussed. The schematic and procedural problems of systems design, its basic parameters (considering the qualitative possibilities of the unified system of computers) are analyzed. The organization of the information software for the ASU is discussed.

The book is for developers of ASU and the specialists dealing with the introduction, operation and maintenance of the ASU.

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G. R. Greyner, et al, PROYEKTIROVANIYE BESKONTAKTNYKH UPRAVLYAYUSHCHIKH LOGICHESKIKH USTROYSTV PROMYSHLENNOY AVTOMATIKI (Planning and Design of Contactless Control Logical Industrial Automation Circuits), Moscow, Energiya, 1977, 384 pages, 15,000 copies, 1 ruble 97 kopeks.

The discussion includes the following: the mathematical principles of the construction of logical circuits, the engineering methods of logical synthesis and the application of computers for synthesis, the technical specifications of contactless logical elements, standardization of the functional units and assemblies, the description of the test bench and methods of bench testing of the assemblies for the designed contactless logical circuits.

The book is designed for engineering and technical workers dealing with the planning, design, operation and maintenance of automated devices.

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V. N. Silayev, V. A. Vertlib, D. S. Margulis, DIALOGOVAYA SVYAZ' V TELE-AVTOMATICHESKIKH SISTEMAKH MASSOVOGO OBSLUZHIVANIYA (Dialog Communications in Remote Automated Queueing Systems), Moscow, Energiya, 1977, 112 pages (Library on Automation, No 573), 8,000 copies, 39 kopeks.

The discussion includes the following: the peculiarities of the remote automated queueing systems, the effectiveness of using the communications channels and the equipment when ensuring given requirements on the queueing parameters, the structural organization of the terminal complexes, the information network, the devices for direct coupling of the computer to the communications channels, evaluation of the quality of the functioning of the queueing systems from the point of view of reliability.

The book is designed for engineering and technical workers specializing in the field of automated management systems (ASU).

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B. V. Anisimov, N. N. Gornets, SISTEMY VVODA-VYVODA TSIFROVYKH VYCHISLITEL'-NYKH MASHIN (Input-Output Systems for Digital computers), Moscow, Mashinostroyeniye, 977, 112 pages (Computer Engineering), 20,000 copies, 29 kopeks.

The hardware and software organization of the input-output systems of the third generation digital computers, the organization of the input-output channels and the channel voltage systems with peripheral devices are discussed. The selector, multiplex and modular channels are analyzed in various operating modes. The interface control both from the channel side and from the peripheral device side is considered.

The book is designed for engineering and technical workers dealing with the development of computer engineering means and the equipment for automated management systems (ASU) and also their operation and maintenance.

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N. V. Buslenko, AVTOMATIZATSIYA IMITATSIONNOGO MODELIROVANIYA SLOZHNYKH SISTEM (Automation of the Simulation of Complex Systems), Moscow, Nauka, 1977, 239 pages (Programmers Library), 25,000 copies, 79 kopeks.

The discussion includes electronic computer software techniques (package of applied programs with local operating systems) which is a universal automated simulation model of a complex system. The procedures for mathematical description of the complex system adopted when constructing the universal automated simulation model, its execution on the computer and the practical execution procedures are analyzed.

The book is designed for workers in the computing centers.

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V. P. Gladun, EVRISTICHESKIY POISK V SLOZHNUKH SREDAKH (Heuristic Search in Complex Media), Kiev, Naukova Dumka, 1977, 166 pages, 2,550 copies, 1 ruble 07 kopeks.

The discussion includes the automation of the search for the solution to problems,the methods of organizing memory providing for the storage of the associative relations between the individual information elements, the methods of classifying materials with which the problem solver works, the methods of representation of situations and operators in the computer memory, and the description of various solution search strategies.

The book is designed for specialists dealing with the problems of artificial intellect and engineers working in the field of robot engineering and automation of scientific research.

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V. V. Martynov, UNIVERSAL'NIY SEMANTICHESKIY KOD (Universal Semantic Code), Grammar, Dictionary, Text, Minsk, Nauka i Tekhnika, 1977, 191 pages, 2,600 copies, 1 ruble 05 kopeks.

The discussion includes a system description of the universal information language and its application in science and production, the alphabet of symbols, the rules for their combination and the generating grammar of the lexical units, a brief dictionary and texts in specialized notation and in natural language, the rules of standardization of the special information languages in accordance with the structure of universal semantic code, the use of the semantic code as the interbranch information language and as the language of artificial intellect.

The book is designed for specialists in the field of informatics, automated management, heuristics and engineering psychology.

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G. V. Druzhinin, NADEZHNOST' AVTOMATIZIROVANNYKH SISTEM (Reliability of Automated Systems), Third Edition, Revised and Supplemented, Moscow, Energiya, 1977, 536 pages, 15,000 copies, 1 ruble 81 kopeks.

The discussion includes an investigation of the problems of ensuring reliability of automation devices and systems, the peculiarities of the measurement and calculation of reliability, the application of simulation for predicting parametric reliability, methods of creation and calculation of the reliability of redundant systems, means of improving the reliability during

design, manufacture, operation and maintenance, and the peculiarities of investigating the reliability of man-machine systems.

The book is designed for engineering and technical workers dealing with the problems of reliability of automation devices and systems.

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G. P. Katys, OPTICHESKIYE INFORMATSIONIYYE SISTEMY ROBOTOV-MANIPULYATOROV (Optical Information Systems of Robots and Manipulators), Edited by B. N. Petrov, Moscow, Mashinostroyeniye, 1977, 272 pages, 6,000 copies, 1 ruble 37 kopeks.

The principles and methods of efficient construction of optical information systems, robot manipulators and autonomous devices are discussed. An analysis is performed of the efficient structure of the assembly and primary processing systems for the visual information, the means of optimizing the scanning and search procedures, methods of determining the efficient laws of scanning space and, in particular, scanning with adaptation, pattern recognition (halftone and double gradation two and three dimensional) and analysis of their precision characteristics, a comparison of a number of the recognition methods and determination of the optimal areas of their application.

The book is designed for scientists and engineering and technical workers dealing with the creation and investigation of optical information systems.

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A. S. Klyuyev, B. V. Glazov, M. B. Mindin, TEKHNIKA CHTENIYA SKHEM AVTOMATICHESKOGO UPRAVLENIYA I TEKHNOLOGICHESKOGO KONTROLYA (Reading Equipment for the Automated Management and Technological Monitoring Systems), Edited by A. S. Klyuyev, Moscow, Energiya, 1977, 296 pages, 40,000 copies, 1 ruble, 32 kopeks.

The discussion includes the reading of structural and installation monitoring and automatic management systems for technological processes, the description of the basic circuit elements, their designation on the drawings, and the interrelation between the elements and the target.

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Yu. A. Krivonogov, TEKHNICHESKIYE SREDSTVA SVYAZI ASU (Technical Communication Means for Automated Management Systems), Kiev, Tekhnika, 1977, 133 pages, 9,000 copies, 65 kopeks.

The discussion includes the principles and the procedure for planning and designing complexes of technical communication means for the operative dispatch control systems and the problems of their practical application.

The book is designed for engineering and technical workers dealing with the development and introduction of management systems and their hardware.

USSR

BURTSEV DISCUSSES FOURTH-GENERATION EL'BRUS ELECTRONIC COMPUTERS

Moscow PRAVDA in Russian ["Electronic Computers:Express Delivery of Generations"] 4 Apr 78 p 3

BURTSEV, V., corresponding member, Academy of Sciences, USSR

[Text] The continually increasing role of electronic [EVM] in all areas of human activity is a typical trait of the scientific-technical revolution. The significance of high-capacity EVM, which are promoting acceleration of progress in the national economy's leading sectors, is especially great. High-capacity EVM are precisely what are opening fundamentally new perspectives for planning complex objects, together with a much shorter time for their development and introduction into production. On this basis, for example, it would be possible to achieve a significant impact in the planning of modern ships and airplanes, complex control systems, high-output information and EVM complexes, microelectronic circuits characterized by a high degree of integration, and so on.

But if we are to plan such complex objects, we need GVM complexes capable of performing several hundred million operations per second. The fact is that the higher the capacity of the complex, the better the design concept selected would be. High-capacity EVM also permit us to model the conditions in which large objects will be working. This is why the need for complex natural tests and the associated capital outlays would decrease considerably. Such modeling, however, of an airliner for example, could be done only in the event that the capacity of the EVM is two or three orders of magnitude greater than that of EVM presently in series production.

It would be difficult to overstate the significance of high-output EVM to fundamental research in various areas of modern science as well. Their contribution to deepening our knowledge of the structure of matter, to space research,and to development of geophysics is especially important. Their role is not any less in the planning and control of the national economy. There, they are especially necessary for complex calculations associated with developing various versions of current and long-range plans for development of the country's economy.

High-capacity EVM can serve as the basis for a network of time-sharing EVM centers. This means that they would become accessible to broad use in the most diverse spheres of human activity.

In examining the problems of designing and operating high-capacity EVM in our country, we will use the traditional term "EVM generation." The first three generations differ from one another in relation to basic design and technology: vacuum tube-type EVM are in the first generation, semiconductor EVM are in the second, and EVM employing integrated circuits, in which

several logical elements are reduced into a single crystal, are in the third. In contrast to these, fourth-generation EVM would best be characterized by two indices: At the level of design and technology, they make use of large integrated circuits (more than 100 logical elements within a single chip), and new design concepts qualitatively different from the traditional structural ones.

We accumulated experience in creating and using long programs as we operated EVM in the first three generations. The mathematical methods for describing problems--so-called high-level languages which significantly facilitate the work of programmers--were developed.

However, in view of the fact that the structure of EVM in the first three generations differs significantly from the principles behind the structure of high-level languages, the programs written in these languages decreased the effectiveness of EVM use by several times: the time required to solve problems and the memory volume required increased. This shortcoming has been corrected to a significant degree in the structure of fourth-generation EVM.

Work on high-capacity EVM is proceeding in two directions in the Soviet Union--creation, within the framework of the Unified System [YeS] of EVM of high-output third-generation EVM employing a system of commands that is consistent in relation to that used by series-produced low- and medium-output EVM, and development of a new family of multiple-processor fourth-generation EVM.

Tests have already been made on new EVM of the YeS, among them the YeS-1060 EVM, which has a speed of over a million operations per second. It has a complete outfit of magnetic disc and tape memories, alphanumerical and graphical information displays, and a number of other peripheral devices. The productivity of the next, more-powerful computer of this series (YeS-1065) is over 4 million operations per second.

As far as the other direction of the work is concerned, an experimental lot of multiple-processor El'brus-1 computer complexes, structured in accordance with the modular principle, has already been manufactured. This computer allows us gradually to increase capacity by enlarging the number of processors (from 1 to 10) and heightening the capacity of the internal memory (from half a million to 8 million characters), and it opens up the possibility for practically unlimited expansion of the external memory's volume. The capacity of each processor in this complex is over a million operations per second; moreover they work effectively with high-level languages at the same time. The El'brus-1 is outfitted with standard peripheral equipment, including a special high-capacity, high-speed external memory permitting work with large data banks. Thus in relation to design concepts and technology the El'brus-1 is in the third generation, but in terms of the novelty of the design concept it is in the fourth generation.

Further development of the principles embodied in the El'brus-1 has made it possible to develop the multiple-processor El'brus-2 EVM complex, which has an output of more than 100 million operations per second, and begin its introduction into production. It has been created on the basis of the new design concepts and technology of fourth-generation EVM--microcircuits characterized by a high degree of integration, and at the same time it is entirely capable of working with the software intended for the El'brus-1 complex.

The designing and introduction of the El'brus-2 have necessitated industrial production of the latest series of high-speed electronic components and assimilation of a number of complex production processes and unique design concepts, toinclude organization of series production of large integrated circuits, precision multilayer high-frequency printed circuit boards, grouped high-frequency detachable connections, an effective apparatus cooling system, and so on. Development of the design and production documents of the El'brus-2 complex would have been practically impossible without a system of automation of planning outfitted with special software (several million commands).

Use of the methods of automated EVM planning and modern microelectronic technology and development of the design of fourth-generation EVM have permitted us to begin the planning of EVM characterized by even higher output. This has been an important achievement in work on the tasks posed by the 25th CPSU Congress--developing scientific projects directed at improving and making effective use of electronic computer technics in the national economy.

B. Problem Areas

USSR

DIFFICULTIES IN INTRODUCTION OF COMPUTERS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ["Electronic Computers - Working Full-Time"] 21 Aug 77 p 2

NEZABITOVSKIY, A., general director, "Elektronmash" Production Association, Kiev

[Text] Effectiveness of the use of computers in the national economy depends upon the joint efforts of developers, producers, and users. Optimum introduction deadlines and reliability of operation of the machines in the usage period are expressly insured by the reliability of the whole chain: development-production-introduction. The most acute problem here lies in the last stage. I shall present a few figures.

According to the data of the specialized start-up and adjustment service (this service has operated within the Association since 1973), of all of the "M-6000" machines placed with customers, 39 percent were put into operation after a great deal of delay. With a period of introduction of 4 months possible, it actually amounted to 7.4 months on the average. The matter stands no better with the "M-4030" control computing complexes, on the basis of which multi-machine automated systems are created, where the lag amounts to 6.5 months on the average. It is not hard to estimate the losses if it is taken into account that the cost of an hour of machine time for this complex is 90 rubles. The situation adds up to about the same with the other machines.

Undoubtedly the most important factor for accelerating the introduction of new technology into the national economy is the improvement of its quality. With respect to the "M-4030" complex, we were able to raise the level of development and manufacturing technology by an order of magnitude and the product was awarded the Badge of Quality. The staff of our start-up and adjustment service was able to reduce the introduction time of the complex from 3.5 months to two. By the end of the year the adjusters expect to surmount the month and a half limit.

But look what a contradiction this amounts to. On the one hand there is a fine machine, competent installation and adjustment, and a clear-cut organization of labor at the site; while on the other hand in spite of all this we cannot achieve 100 percent machine installation in the established deadlines.

These are the facts. The Leningrad All-Union Scientific Research Institute of Metrology was sent a complex on 6 September; the Institute of Physics of the Academy of Sciences, Georgian SSR, and the Kerchen Fishing Industry Association were sent one 31 August of last year, while installation has not yet been started. I don't think that there are any special factors which distinguish the conditions for successful installation of new technology

at the Nizhniy Tagil Metallurgical Complex from the related enterprise in Rustavi. But the Georgian metallurgists received a machine on 23 February of this year and it was placed in operation on 22 June, while in Nizhniy Tagil they received a machine in December 1975 and they called for adjustments at the beginning of this year, when the guarantee period had already expired.

From February 1976 to the present time, 38 out of 94 computers have not been placed into operation. The reason is quite elementary--the customer's lack of preparedness. There is also the unfinished construction at the site, the absence of sensors on technological lines, switching, secondary devices, automation, and, finally, qualified personnel.

These problems can be corrected in part by the efforts of the customer himself. But there are some for which the solutions should have been centralized a long time ago. For example, false flooring is a rather complicated engineering structure which to date everyone does in his own way and on an independent basis, because there is no one plant in the country which produces everything needed. Also personnel training. Personnel training for our computers is carried out by a single institution which is not in a position to quarantee the fulfillment of requests. We cannot help but be concerned about this, both because the number of machines is increasing from year to year, and because installation and startup is only the beginning of a computer's life. And how it will be in the future is of concern to us, to the customer, and to the government.

The problem of effective use of computer technology means is many-faceted. Let us consider an ideal variant: the machine's readiness for use coincides with the customer's readiness to successfully utilize it--in the allotted time the technology is assembled, adjusted, and introduced. What next? Let's return again to practice. For example, the "M-4030" machine should work twenty-two hours a day. Two hours are set aside for preventive maintenance. But for the present the best time is 18 hours, while the average figure is much less. The technological utilization factor of computers cannot help but cause alarm. According to the data of the Kiev Specialized Star Startup and Adjustment Service, for "M-4030" units set up in Moscow, Leningrad, Minsk, Yaroslavl, and Tyumen' it [the technological utilization factor] amounted to 0.6-0.8 instead of 0.95.

It is good that there is a current boom in computers. The superficial attitude of the consumer, which may even be termed light-minded, to this kind of technology--I will sit down and it will think for me--is passing away. However, at least three conditions are also necessary at the present time: that the client provide people who know why the machine is needed; that problems be prepared which the machine can solve; and that optimum conditions be created for the most complete utilization of its capabilities.

Unfortunately, it is not rare to encounter unpreparedness of the packet of application programs used in the ASUTP [automated management system for technological processes]. The fact is that the machine is furnished with service (standard) software with which any given volume of problems may be

solved. However, this does not at all mean that all of its capabilities will be fully worked.

The standard software cannot satisfy the serious client; therefore our initial startup management is concerned with modification and evolution of systems of software for small machines--further improvement of the modules is being carried out and the carriers and documentation are being multiplied. The application program package must be reoriented for the specific user in conformity with different kinds of production. Here we are talking about controlling technological processes. The "pipe dream" of adjusters is to take along an operationally completed system.

In order to solve this problem it is necessary to centralize the software. An attempt to accomplish this was made to some degree at the Ministry of Instrument Building, Automation Equipment and Control Systems where an information-reference system (SIF) was created. Let's say a user needs to solve a given problem: he does not need to waste time in the preparation of the software; he just buys it at SIF.

The time is ripe to solve the pressing problem of centralization of computer servicing and accelerate the construction of technical service centers. Every year there are more control machines, especially small ones.

This accentuates the necessity of expanding the network of computer centers for collective use. In this case the machine load is increased and the users' preliminary debugging of programs is simplified--they are freed from dealing with service personnel.

At present, when many problems of accelerating the introduction of computer technology and using it skillfully are in the solution stage, a part of this task, which is immense and absolutely necessary to society, has been taken on by the association of computer users which are being established. These are public scientific and technical organizations which establish strong connections between components concerned with development, production and exploitation of computer technology. The experience of the association of "Mir" machine users indicates that constant communication with the client, a flow of feedback information and the timely and concrete help of the manufacturing plant make it possible significantly to accelerate the rate of modernizing technology and moreover increases the yield of ideas and resources embodied in each new model.

The associations include hundreds of member-organization which to a certain degree insures a centralized systems approach to mastery and utilization of a given computer model on a nationwide scale. Unfortunately their creation is contingent with difficulties of an organizational nature. Of this we are convinced, having made an attempt to create an association for the "M-4030" machine. There is still no legal status determining financial rules or powers for these organizations.

Practice confirms that only by uniting forces and boldly attacking the range of unsolved problems we will give our technology full-blooded life.

USSR

IS ASUP EFFECTIVE?

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 1, Jun 78, p 4

[Text] An article with this title was published in our magazine (No 8, 1977) under the authorship of A. Il'in and P. Bykov, staff members of the Central Scientific-Research and Planning and Technology Institute for the Organization and Techniques of Management. It was pointed out in the article that individual enterprises in their quest for modernization had begun to create ASUP (automated production management system) without having taken into full account its capabilities. As a consequence, in light industry, the Belorussian SSR is operating low-efficiency, undeveloped ASU (automated management system).

Why has this happened? N. Sysov, director of the Minsk Production Association imeni Krupskaya, explains, "The creation of ASU at MPSHO [Minsk Garment Manufacturing Association] imeni Krupskaya was dictated by the steady growth in productive capacity, its rate, the number of workers, the complexity of production-economic relationships, the increasing flow of data, etc. It was developed in accordance with the directive from the Belorussian SSR Ministry of Light Industry. Initially, the developers included nine tasks which were handled by EVM and nine on four SPM [punch card equipment] subsystems. Economic savings were calculated at 81.6 thousand rubles with an amortization period of 1.9 years.

"Neither the garment workers nor the developer had at the time the experience for creating ASU in the garment industry. Therefore, from the onset tasks of a bookkeeping nature were included, although everyone knew that they were not efficient enough. In the process of developing both the project and its industrial utilization, four tasks have already been removed from consideration as nonefficient.

"The initial phase of the ASU for MPSHO imeni Krupskaya commenced industrial operation with many comments from the view of the user on finishing the tasks. The "finalization" continued for 3 years (the task was "In-Line Record Keeping for Product Shipment"). Not having confidence in TSNIITU [?Central Scientific-Research Institute for Control Technology], the garment workers have performed much of the work themselves. Several tasks were completely redistributed in accordance with industrial requirements and a system taking into account the strengths of MLP [Ministry of Light Industry] ASUP and ROVT [?State Computation Service Center] workers in the Belorussian SSR.

"Consequently, the main reason for the low efficiency of ASUP's first stage was the ill-timed and poorly conceived turn over of the system to industrial operation, and also the absence of the specialists and technical facilities envisaged for the project.

"To raise the efficiency of the system, the ASUP section of the association worked out and introduced a set of tasks for recording and analyzing output and product quality, the results of intra-factory socialist competition and calculating labor performance. The introduction of these tasks supported all the industrial sections with necessary data on product output and partially freed nearly 40 men who had been doing record keeping by hand.

"At the present time, the second stage ASUP, encompassing a number of optimized tasks, is under development. The monetary savings are 242 thousand rubles."

A serious reproach for TSNIITU is also expressed by D. Kupreychik, deputy director and chief economist for the Minsk Production Association, "Kommunark." An automated management system, "ASU--Kommunark" was developed by TSNIITU between 1972 and 1975. Initially there were 27 tasks in the technical program for systems' development. In conjunction with the decrease in centralized financing in 1974, the number of tasks decreased to 18. The annual economic effect from the introduction of ASUP, calculated by the developer at the stage of introduction was 160 thousand rubles. The amortization period--1.25 years.

The system was accepted for industrial operation in November 1975 in an incomplete state--of the 18 tasks in the technical program, only 13 were received, and of them 7 required modification upon recommendation of the interdepartmental commissions. Corrections to the tasks continued through 1976-1977, and in the process three of them were entirely redeveloped. Today 15 tasks are functioning in an industrial mode. Three tasks which could have had a significant economic impact have still not been turned over to industrial operation by the developer. All this represents the primary reason for the inefficient operation of the "ASU-Kommunark" system.

It comes down to the fact that those mainly at fault for the unprofitability of ASU are the developers. It is at the design stage that discrepancies, errors had inadequate utilization creep in and then result in the inefficiency of automatic control systems.

What then can be done to raise the level of the systems under development? We address this question to the leadership of the institute.

USSR

SHORTAGE OF MATERIALS AND SPECIALISTS

Moscow SOVETSKAYA TORGOVLYA in Russian [Organization and Management: Computers to the Ready] 28 Mar 78 p 2

IVANOV, M., minister of trade, Kazakstan SSR, candidate in economic sciences

[Excerpts] Much has been done in recent years to introduce automated management systems (ASUT) in Kazakstan. Initial versions of ASUT have been accepted in the largest cities of the republic--Alma-Ata, Karaganda and Chimkent. Here, collective computing and information centers equipped with ES [Unified System]-1022, ES-1020 and "Minsk-32" computers have been established. In addition, computational centers and bureaus processing trade-economic information operate in oblast centers. In 1977 alone, electronic computers in the republic helped handle work in the amount of 3.3 million rubles.

Since the beginning of the Five-Year Plan, more than 50 accountants with an annual wage budget in excess of 80 thousand rubles have been conditionally released in Alma-Ata alone.

But this is only the beginning. Specifications have been prepared for a sectorial automated trade management system (OASUT), the automated management system (ASU) of the republic "Kaztorgodezhda" [Kazakstan Clothing Trade] Office. Its information facilities include a so-called automated data bank in whose "memory" all basic trade-economic information will be stored. Work on the development of the second version of the OASUT is proceeding on three levels of management: the Ministry of Trade, the republic wholesale bureau and the Oblast Trade Administration. It will perform tasks ensuring more effective management of the industry.

The board of the republic Ministry of Trade recently adopted a decree regarding the introduction of ASUT and its practical application to specific tasks. It outlined a concrete program whose implementation will permit raising the effectiveness of management of the industry. In particular, the establishment of computing-information centers in Aktyubinsk and Dzhambul was called for before the end of the Five-Year Plan. The introduction of unified programs and ASU project standards decisions in the system of state trade of the republic is proceeding. Strict controls on the completion of the projected program have been established.

The introduction of ASUT promises great benefits. But it is accompanied by great difficulties. One of these is the absence of project standards decisions. As we introduce the ASU, there is a great need for such decisions but, regrettably, they are not forthcoming. The Main Computing and Information Center of the USSR Ministry of Trade still has not developed an

industry pool of algorithms and programs; the Kalinin "Tsentr-programmsistem" [Central Programming System] Institute has not issued design standards for software of all ES-series computers produced by our industry. In developing the ASUT, we were forced to develop all documentation with our resources. This takes much time and is very expensive.

Particularly acute is the question of the ASUT information-handling software. The collection, storing, processing and transmission of information remains a difficult problem. There still are no unified industry-wide All-Union product classifications. Problems regarding the standardization of documentation reaching the computer for processing remain unresolved. The stream of incoming information is currently literally drowning the computing centers. This creates additional difficulties in processing it and in the search for optimal management decisions. The matter is complicated by the fact that the developed and introduced ASUT are not tied into the automated management systems of the ministries that produce consumer goods because of the absence of unified All-Union product classifications.

The conclusion is obvious. The All-Union Scientific Research Institute of Trade Economics and Management Systems (VNIIETsistem), the GIVTs' [Main Information Computing Center] of the USSR Ministry of Trade, and the V/O "Soyuztorgsistem" [All-Union Trade System] must decide these questions and come up with system-wide solutions. The specialists of the republic trade ministries need officially approved standard programs and methodologies for all aspects of the development and introduction of ASUT. We are now receiving documentation outlining only the general direction of ASU problems.

There is no way getting around the question of the physical equipment of ASU. Equipment is now arriving at the computer centers and in the accounting-machine stations in an uncoordinated fashion, without the necessary peripheral and auxiliary devices. And that is one of the reasons holding back the introduction of ASUT. Thus, ES-series computers are shipped without invoice printers for perforated forms, without air conditioners and without reproduction equipment. Such equipment must be "pried loose" via the supply organizations. Nor is there a sufficient supply of spare parts. This is the reason why a significant portion of computers stands idle for periods at a time.

The problem of supplies for computers is no less severe. Because of their scarcity it is impossible to increase the work load of the computers and thereby increase output. Volumes have been written about the fact that this situation is intolerable. But matters are not improving. The requirements of our computer centers and accounting-machine stations for punched cards continue to be satisfied by only 40 percent, and for perforated paper, by 30 percent. Printer ribbons and carbon paper generally are not issued to us at all.

And we would like to focus attention on yet another problem. Year after year, the higher educational institutions of the country send us an extremely limited number of specialists on the operation of electronic computers and the development and introduction of ASU. For this reason the staff of the

computer centers of the Kazakstan Technical Design Bureau of the V/O "Soyuztorgsistem" [All-Union Trade System] is still not up to authorized strength. In particularly short supply are computer-hardware and mathematical programming specialists. The matter is complicated by the fact that many workers need refresher courses. It is felt that the higher educational institutions of the country should substantially increase the output of specialists in the development and use of automated control systems.

The development of ASU is of great value in its practical application to trade. At the same time it also presents serious problems. And they must be resolved without delay.

USSR

PROBLEMS WITH COMPUTER AND OFFICE EQUIPMENT REPAIR AND MAINTENANCE IN LENINGRAD

Moscow IZVESTIYA in Russian ("When You Have Seven Nannies...") 14 Mar 78 p 2

STRUGACH, Ya., correspondent for LENINGRADSKAYA PRAVDA

[Abstract] The article calls attention to the lack of satisfactory maintenance and repair services for computer and office equipment in Leningrad. It is estimated that the amount of computer and office equipment increases at a yearly rate of 20 percent, but the rate of expansion of maintenance and repair facilities is significantly lower. Two units identified as having responsibility for the servicing of computer and office equipment are the Leningrad division of the Moscow State Experimental Plant for Repair of Computer Equipment of the "Soyuzschettekhnika", [?All-Union Computing Technics] Association, and "Spetsavtomatika" Plant. The former serves only those organizations subordinate to the Central Statistical Administration and accepts only imported machines for servicing. Both units are subordinate to Minpribor (Ministry of Instrument Making, Automation Equipment and Central Systems.

It is said that the needs of enterprises of Leningrad and Leningrad Oblast' for repair of office equipment are being satisfied by only half, and those for repair of control computers by only 20 percent. Ministries which manufacture large computers have been assigned the responsibility for their maintenance and repair, but their primary concern has been the maintenance of third-generation computers. Consequently, owners of computers such as the "Minsk-22","Minsk-32," and "Nairi" are often refused in their requests for

such services. It is said that only about one-third of the computers in Leningrad and the oblast' are entitled to centralized maintenance services. The organizations which provide this service are said to lack adequate facilities, are understaffed, and have difficulty in obtaining parts.

C. Production Plants

USSR

DEVELOPMENTS IN ROBOTS FOR USE IN INDUSTRY

Tallin SOVETSKAYA ESTONIYA in Russian ("The Demand For Robots") 9 Dec 77 p 2

[Text] The VEF (State Electrical Engineering)Plant is the Latvian republic's first enterprise to organize a design bureau for industrial robots. Miniature programmable manipulators will soon replace men in several of the plant's monotonous and dangerous operations. The robots will assemble electronic printed circuit boards and maintain punch presses and casting machines. Many enterprises are interested in the effective utilization of "mechanical arms."

An automated system for the design of programmable mainpulators is being created at the Department of Mechanization and Automation of Production Processes at Riga Polytechnical Institute. It is expected to speed up the introduction of the robot into industry. Electromagnetic robots are being developed at the Institute of Physics, Academy of Sciences, Latvian SSR. These devices recognize and grasp necessary parts and supply them correctly oriented to the automata which assemble them. At another of the academy's institutes, employees are doing research in a new field--electronics and computer technology. They are participating in the creation of multiple-support walking machines with simulated vision.

The Tenth Five-Year Plan will see an extensive program of mechanization and automation of production. An essential role in it will be assigned to general-purpose, easily readjusted industrial robots. New technological processes will be assimilated, smoothness of various operations will increase, and the quality of many types of manufactured products will improve.

USSR

"ISKRA 126" MINICOMPUTER ACCEPTED BY STATE COMMISSION

Leningrad VECHERNIY LENINGRAD in Russian 26 Dec 77 p 1

RODICHEV, S.

[Text] The "Iskra-126" miniature keyboard computer, developed by associates of the Leningrad Bureau for Design of Calculators, has been accepted and rated "excellent" by a state commission.

Easily adapted to desk use, the "Iskra-126" performs complex scientific, technical and engineering computations and solves accounting, statistical

and economic problems. In addition, it may be used for man-machine dialogue with large computers. The screen displays essential information. The computer will be adopted at institutes, design bureaus and computer centers.

USSR

M-5000 CALCULATING MACHINES PRODUCED IN VIL'NYUS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Jan 78 p 2

[Text] One of the largest suppliers of calculating machines is the Vil'nyus Calculating Machine Plant imeni V. I. Lenin. The enterprise's collective is currently producing M-5000 punch-card calculating complexes for processing economic information. These electronic computers are intended for use in the Central Statistical Administration (TsSU) and computer centers of ministries and enterprises.

(A photograph--shows three technicians adjusting equipment.) (Next page)

USSR

"ISKRA-1256" ELECTRONIC KEYBOARD COMPUTER

Leningrad LENINGRADSKAYA PRAVDA in Russian ("Doctor's Helper") 16 Feb 78 p 1

MARIN, V.

[Abstract] A new electronic keyboard computer, the "Iskra-1256", has been developed by employees of Leningrad Design Bureau for Design of Calculating Machines [Schetnaya Mashina]. It has been evaluated as "excellent" by a government commission. The computer will collect information from various diagnostic devices and will be implemented at clinics, institutes for preventive treatment, and hospitals. The first consignment will be produced this year.

USSR

KISHINEV CALCULATING MACHINE PLANT BEGINS SERIES PRODUCTION OF MACHINE TOOL PARTS

Moscow PRAVDA in Russian ("Computers for Machine Tools") 10 Mar 78 p 2

[Text] The Kishinev Calculating Machine Plant [Kishinev Zavod Schetnykh Mashin] imeni 50th Anniversary of the USSR has begun series production of parts for machine tools with numerical program control. A photograph shows repairmen checking the operation of new devices.

USSR

FIRST CONSIGNMENT OF SMALL COMPUTERS DELIVERED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("The Electronic 'Infant Prodigy'") 18 Mar 78 p 2

[Text] Moscow--The first consignment of new computers in the family of small computers has been delivered to the country's enterprises and scientific institutions, where they will help industrial workers and scientists monitor technological processes, discover the properties of various materials, and control automatic machines. Series production of these miniature computer complexes was mastered by the "Energopribor" Experimental Plant.

The small electronic computers will find extensive applications in various fields of the national economy. Their large memory capacity and high operating speed allow them to solve complex problems without preliminary processing of the information. Depending on the degree of improvement and complexity in the production process which the computer will be servicing, it can be linked up with other complexes and even used as the basis for establishing a powerful computer center.

Such flexibility in the operation of the small computers makes it possible to utilize their powers very rationally and to accelerate significantly the procedure of processing information. The system of computers of this type was developed on a cooperative basis by the socialist member-countries of CEMA.

USSR

PRODUCTION OF SM-3 MINICOMPUTERS

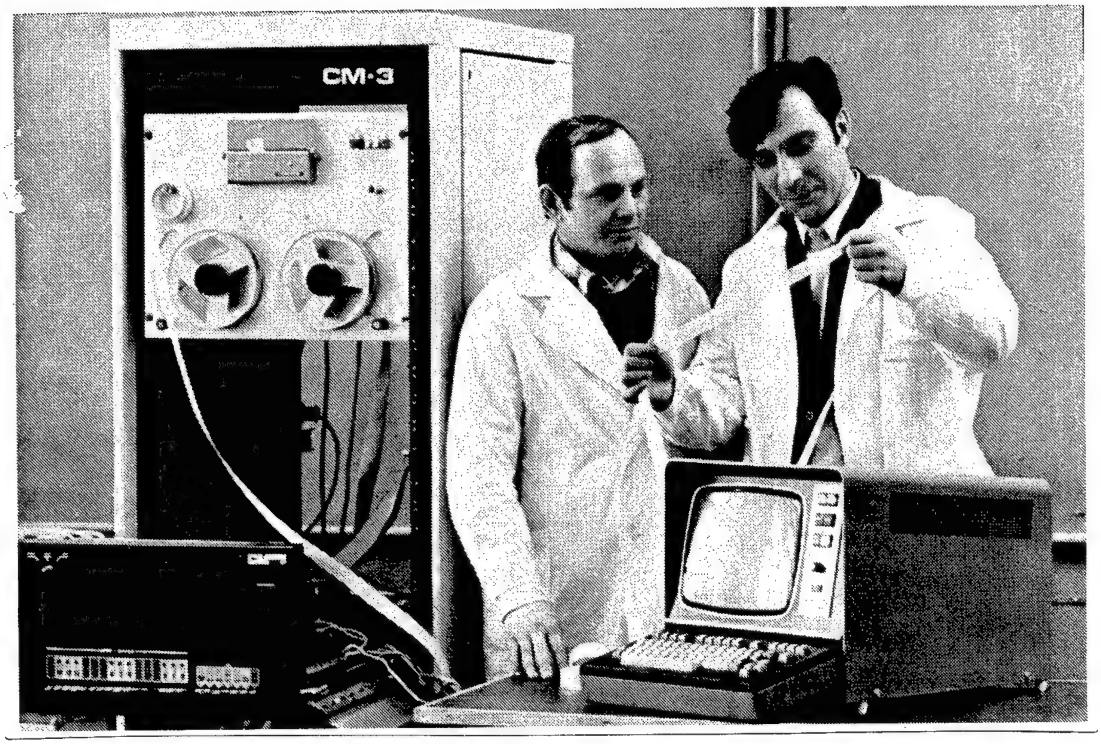
Riga SOVETSKAYA LATVIYA in Russian ("The System of Small Computers Is Being Developed") 19 Mar 78 p 3

[Text] The Experimental Plant "Energopribor" in Moscow is mastering the production of one of the complexes of the new system of small electronic computers [EVM]. The first models from the experimental industrial consignment of the system of small computers has been delivered to the Academy of Sciences, USSR, for use in scientific research.

The system of small computers is being developed on a cooperative basis by the socialist countries at their most advanced technical facilities. Individual data units for the computer systems are being manufactured in Poland, Bulgaria, Hungary, and other CEMA countries.

In the photograph: adjustment of a unit of the SM EVM [system of small computers] is being carried out by engineers (left to right) Anatoliy Poloterov and Aleksandr Blinkov.

[Photograph appears on next page]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USSR UDC 681.3.06.44

AUTOMATION OF PLACEMENT OF CONTROL ELEMENTS ON CONSOLE

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977, pp 130-134
manuscript received 11 Aug 76; after completion, 4 Jan 77

GLUZHKOV, NIKOLAY GAVRILOVICH, engineer, Mariysky Polytechnical Institute (Yushkar-Ola); MERKUR'YEV, VASILIY VASIL'YEVICH, engineer, Mariyskiy Polytechnical Institute (Yushkar-Ola); POVILEYKO, RYURIK PETROVICH, candidate in technical sciences, Novosibirsk Electrical Engineering Institute (Novosibirsk); PRON', SERGEY PETROVICH, engineer, Mariyskiy Polytechnical Institute (Yushkar-Ola) and TEL'NYKH, OLEG ALEKSEYEVICH, candidate in technical sciences (Moscow)

[Abstract] The problem is posed of optimum placement of control elements [EU] on a console panel. A numerical comparison is made of various methods of solving the problem. A program is developed for finding the optimum placement. The procedure for automated placement of EU, which was developed and tested, is of interest for a sufficiently extensive class of control consoles for monitoring, alignment, and adjustment of various processes, the speed of response of which is limited by the psychophysiological potentialities of the operator. Placements obtained with the aid of an electronic computer have a total length of the trajectory of the control action of the operator 1.5--2.5 times smaller than placements which are assigned by the designers. The control console is very promising and can serve for control of the most diversified technological processes. Figures 1; tables 2; references 14: 9 Russian; 5 Western.

USSR UDC 621.318:681.321.4

INFORMATION READOUT IN MEMORY AND LOGIC DEVICES EMPLOYING CYLINDRICAL MAGNETIC DOMAINS

Moscow AKTUAL'NYYE VOPROSY TEORII I PRAKTIKI UPRAVLENIYA in Russian Ya. Z. Tsypkin, editor-in-chief, Nauka 1977 pp 197-202

YURCHENKO, S. YE. and MATVEYEV, S. N.

[Abstract] An important problem in designing memory and logic devices utilizing cylindrical magnetic domains (TsMD's) is that of reliable information readout, consisting in the necessity of registering changes in magnetic flux of the TsMD stray field (10^{-5} to 10^{-4} microseconds) during the period stipulated by the response of devices utilizing TsMD's (on the order of 1 to 10 microseconds). Here a report is given on new devices which solve this problem, as well as that of simplifying the technology for making such

devices by employing single-film spraying and etching of permalloy through a single photolithographic mask. A study was made of a ring-type magnetoresistive sensing element which was a component of a mockup of a memory device with a 96-bit capacity. The three-film photolithographic process was used to make the mockup. Permalloy was vacuum vaporized to obtain a control coating approximately 1 micron thick; a magnetoresistive readout sensing element 400 Å thick was obtained by plasma spraying; high-frequency spraying of gold was used to obtain current conductors. The magnetoresistor had a mean diameter of 100 microns and was 36 microns wide. The TsMD medium material employed was a wafer of yttrium orthoferrite 60 microns thick with an effective domain diameter within the 90 to 110 micron range. The open-ring shape of the magnetoresistive thin-film sensing element ensures fuller utilization of the TsMD stray field than previous designs. Experimental curves demonstrate that the optimal dimensions of the domain concur with the mean diameter of the ring-type sensing element. The sensing element demonstrated a good ability to function well over the range of variation of the displacement field and control field suitable for practical application in various TsMD devices employing orthoferrites. The domain can be extended in devices utilizing garnet-ferrite films by means of propulsion elements of the chevron type, as a means of amplifying the output signal by increasing the domain's area. These chevron-type elements are employed to read bubble domains by interconnecting the chevrons in a stack and passing current through them. Employing this chevron structure for both propelling and reading components makes it possible to make the entire device with a single photolithographic mask, thus eliminating problems of alignment associated with the fact that the distance between components of a device is a total of 1 to 3 microns. A study was made of a single-film permalloy sensing element consisting of 13 chevrons connected in series along their edges; the same element was also used to propel bubble domains. In reading bubble domains measuring 20 microns, an output signal or the order of 0.6 mV was obtained in a Bi garnet-ferrite film, i.e., a signal sufficient for further amplification and utilization in TsMD devices. It is concluded that the problem of reading bubble domains can be considered solved in its essential aspects; further research should be aimed at amplifying the output signal and improving the signal-to-noise ratio. Figures 3; references 9: 1 Russian, 8 Western.

USSR

UDC 621.318:681.32

STUDY OF INFORMATION INPUT CIRCUITS IN DEVICES EMPLOYING CYLINDRICAL MAGNETIC DOMAINS

Moscow AKTUAL'NYYE VOPROSY TEORII I PRAKTIKI UPRAVLENIYA in Russian, Ya. Z. Tsypkin, editor-in-chief, Nauka 1977 pp 188-193

ROMANOV, A. M. and MATVEYEV, S. N.

[Abstract] Promising computer hardware components are logic and memory devices employing cylindrical magnetic domains [TsMD] as information media. The method of controlling TsMD's by means of thin-film magnetic coatings sprayed onto the surface of the TsMD medium material is extensively employed at the present time. A magnetic potential level differential is created on the surface of the TsMD medium material by magnetic reversal of the thin-film magnetic coating by means of an external magnetic field. TsMD's are controlled by changing the sign and level of the differential. The functions performed by the coatings are determined by their configuration and dimensions. This paper is devoted to a study of the proper choice of TsMD generator circuits, as the most critical components of TsMD control circuits in that they have a narrower frequency range in terms of optimal functioning, as compared with other circuit components. TsMD generator circuits were studied, in which the donor domain is created by the presence of a magnetostatic trap formed by a permalloy circuit component. Various combinations of generating and propelling elements were studied, in that the best choice of a TsMD generator circuit component is determined by its ability to function well along with components of the propulsion circuit. Combinations of round, square and rhombic TsMD generators with T-1 and Y-1 types of propulsion circuit elements and a passive annihilator were made and studied.

The permalloy film was 1.5 to 2 microns thick. A range of proper functioning was studied at 10 Hz by direct visual monitoring and at 10 kHz by means of the stroboscopic method of observation. Studies were made with an $Sm_{0.55}Tb_{0.45}FeO_3$ orthoferrite specimen 50 microns thick and a static TsMD diameter of 42 microns. The widest range of proper functioning was displayed by a thin-film magnetic structure containing a rhombic TsMD generator and a T-1-type of propulsion circuit control coating. A study was also made of the feasibility of controlling the process of TsMD generation, by considering the best general-purpose method, in which the control element is a conducting loop in which, when a current pulse is supplied, either a potential barrier is created in it along the path of motion of TsMD's, thus hindering propagation of TsMD's (the "prohibit" mode), or a "permit" situation, when a current pulse of opposite polarity is supplied. A description is given of the process of filling the data array when employing both modes, in terms of circuit component functions. It was found that for the purpose of achieving stable operation of a controlled generator in the "prohibit" mode it is necessary for the local magnetic field created by it to be approximately 1.5

times greater than the field created by the square component of the propulsion structure under the effect of the external control field. It is concluded that in designing TsMD devices employment of a generator of rhombic form is recommended, and the "permit" mode when utilizing controlled generation by means of a control loop. Figures 5; references 5: 1 Russian, 4 Western.

USSR

M 31-03 INVERTER UNIT FOR ELECTRONIC COMPUTER

Moscow TEKHNIKA I NAUKA in Russian ("So That the Computer Does Not Miscalculate!") No 11, 1977 p 46

[Text] Electronic computer [EVM] errors can be both comic and tragic. It is particularly important to provide for precision operation in electronic equipment whenever they control production--in ASUP (automated production management systems). The main thing for flawless EVM operation is having a continuous flow of electric power with strictly defined parameters. The M 31-03 inverter unit manufactured by the Czechoslovakian association, "Martimeks" allows us to avoid the slightest oscillations in the network and even brief interruptions in current supply. It automatically controls, and with a high degree of precision stabilizes, output voltage and current frequency; and when a failure does occur, it immediately shuts off its storage batteries. This device can also provide for reliable operation of a wide range of electronic measuring and monitoring instruments.

USSR

MAGCARDS FOR DIGITAL COMPUTER PERIPHERALS STUDIED IN NEW BOOK

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, Nov-Dec 1977 p 124

[Annotation to the book "Periferiynyye ustroystva TsVM na magnitnykh kartakh" [Digital Computer Peripherals Employing Magcards] by R. Ya. Chernyak, Izdatel'stvo Naukova Dumka, Kiev, 1978, 3000 copies, eight quires, 1 ruble, 20 kopeks]

[Text] This monograph is devoted to the question of enhancing the efficiency of data processing hardware by employing magcards as the information

medium. A unified hardware system is discussed which is designed for constructing peripherals and has been developed on the basis of magcards at the Institute of Cybernetics, Academy of Sciences, UkrSSR. The results are given of experimental studies of this system's units and components. A description is given of a number of digital computer peripherals implemented on the basis of the system's hardware. A demonstration is given of the feasibility and an evaluation is made of the economic efficiency of employing magcards for creating complexes for digital computer information preparation and input/output.

This book is intended for scientific and engineering and technical personnel working in the field of digital computer technology and automated control systems. It can be useful to students and graduate students in VUZ's.

USSR

DOMAIN TECHNOLOGY OPENS NEW AREAS OF COMPUTER DEVELOPMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Electronic Computer In One Crystal") 22 Dec 77 p 4

KROKHIN, YU.

[Text] The picture in the eyepiece of the microscope was not very interesting. A stream of tiny bright dots flowed along T-shaped patterns applied to the surface of a film of crystal. Pressing a button on the control panel sometimes caused them to increase, to decrease, or caused the number of dots of light to change.

"You have the rare opportunity to see elementary units of information in motion," said S. Smirnov, a member of the Department of Domain Devices of the Institute of Electronic Control Machinery. "One unique feature of domains, as these dots are called, is that their behavior in actual systems can be seen by the eye ..."

Just what are domains, those tiny things whose surprising properties were not even suspected by scientists until quite recently? "Domain" is an English word, meaning "area" or "sphere." In engineering language, domains are areas of spontaneous magnetization, formed in magnetic single crystals. What does this mean?

A magnetic field in one direction is applied to a section of the surface of a crystal plate, magnetized in the opposite direction. A local area of

magnetization is formed. Its shape is near cylindrical. This is a domain. It has been noted that there are conditions under which the domain structure of a crystal becomes ordered, i.e., convenient for control. Using a rotating magnetic field, specialists have gained the ability to control the domains, have developed the principles of writing and reading of information from domain structures. The boundaries of technical application of cylindrical magnetic domains, or CMD as they are more familiarly called, have also been defined.

"What advantages do we gain by using domain technology," says corresponding member of the Academy of Sciences, USSR, Director of the Institute of Electronic Control Machines, B. Naumov, anticipating my question. "First of all, this new technology allows us to use the tremendous volumes of memory which are a part of the microprocessors of the new generation of computers, to achieve high data retrieval rates. And also, the power consumption of domain technology is extremely low, and information is not lost when the machine is turned off. Domain technology is much simpler than the technology of manufacture of semiconductor integrated circuits. This means that the new devices will be much cheaper than their predecessors when they are put in large series production.

The prospects for the application of CMD are extremely broad. In addition to memory devices themselves, domains will be used to create logic systems, meaning that an entire computer can be placed...in a single crystal. We must also remember that domains can be used in the construction of hardware for the recording and transmission of information, for automatic polar stations, on-board systems for aircraft and spacecraft, communication switching devices, program controlled machine tools, displays, etc. As logic and memory devices, domains allow more effective control of all kinds of household equipment as well, from television sets to washing machines..."

"The capabilities of domains are demonstrated most clearly by the figures," reports the head of the Department of Domain Devices of the Institute, Candidate in Technical Sciences V. Rayev. "For example, the density of recording of information in the magnetic disc memories now used in computers is 10^6 bits per cubic centimeter. Even today domains can raise this figure by 3 or 4 orders of magnitude, i.e., they can achieve approximately the density of storage achieved by the neurons in the human brain. Soon, we should be able to use domains to produce a physical model of the processes occurring in the human brain. But this is not the limit. According to our estimates, it will be possible to create domain devices with a density of placement of functional elements of 10^{19} bits per cubic centimeter, approximately the same as the density of genes in molecules of DNA. This will open truly tremendous capabilities for the creation of automata which will not only be able to perform the functions of intellect, memory and the ability for decision making, but also the functions of self-reproduction, producing "progeny" which will "inherit" the best properties of their "ancestors..."

USSR

MICROCARRIER STORAGE DEVICE INVENTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Electronic Storage") 26 Jan 78 p 2

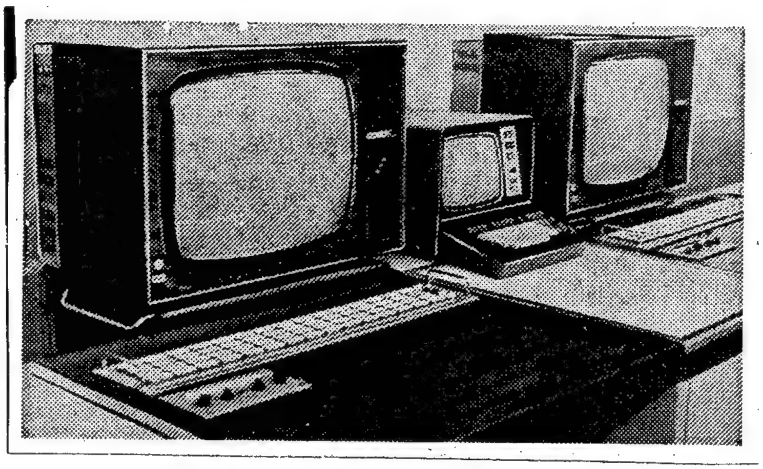
[Text] Vinnitsa--The staff of Vinnitsa Central Design Bureau for Information Technology has invented a storage device for microcarriers which will be distributed to consumers of scientific-technical and other types of information. The device has long been awaited in archives, museums, science libraries, scientific-research institutes (NII) and other organizations where a large volume of information must be processed and rapidly issued.

USSR

NEW AUTOMATED MANAGEMENT SYSTEM DEVICES USING COLOR

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Directions, Prospects. Of Importance--Color Too") 9 Feb 78 p 4

[Text] It is not easy to be operators of automated management systems (ASU) for complex processes and objects. It is not just a matter of the large volume of information coming to them, but also its variety. Taking this into account, the specialists of the State All-Union Central Institute of Complex Automation have developed the information display device "Orion" (picture below)



On the screens of its colored television display units, operating as a pair with "M-6000" and "M-7000" computer complexes, information appears in the form of graphic panels, charts, numerical parameters, and texts of advice and recommendations to the operator generated by the computer. In addition, the image on the screens is formed from unchanging, static information which comes from drawings and slides and is in the color blue and dynamic, operational information which comes from the computer in the colors green, red, and violet.

HUNGARY

RELATIONSHIPS BETWEEN COST AND TECHNOLOGICAL ADVANCEMENT IN THE MEMORY INDUSTRY INDUSTRY

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 10-17
manuscript received 8 Sep 77

LAZAR, GYORGY, teacher, SZAMOK [Computer Technology Training Center]

[Abstract] This article is based on the author's lecture delivered at the 26 May 1977 International Minicomputers-Microcomputers-Microprocessors '77 Conference, held in Geneva, Switzerland. An attempt is made to analyze future price trends for computer memories based on curves illustrating development curves (showing space saving, performance improvements, and the like), cost and price curves (showing the effects of lifetime also), and relationships between these curves as illustrated by combined trends of lifetime, cost, price, and development. The first noticeable finding is that the consecutive upward jumps in the composite curve show an increasing trend, meaning that each next step forward represents a greater overall improvement than the preceding. Also, the cycle times, meaning the times elapsed between consecutive major advancements, tend to become progressively shorter. Accordingly, the technological jumps become larger and take place more and more frequently. This is illustrated by a brief recapitulation of the technological improvements in memory production and performance. An analysis of the data developed permits channeling research and development toward the most promising fields, which will give major savings and produce increased research and development efficiency. Figures 19; references 29: 6 Hungarian; 1 Czechoslovak; 1 Russian; 21 Western.

USSR UDC 681.327.2

MODELING PAGE MOVEMENT IN A VIRTUAL MEMORY

Moscow AKTUAL'NYYE VOPROSY TEORII I PRAKTIKI UPRAVLENIYA in Russian Ya. Z. Tsypkin, editor-in-chief, Nauka 1977 pp 40-46

BOGUSLAVSKIY, L. B. and SINITSYN, M. D.

[Abstract] Modeling is employed to make an evaluation of the quality of adaptive replacement algorithms for paged-memory computer systems. The replacement algorithm's purpose is to reduce the intensity of page shifting between different memory levels and, thus, to increase the system's efficiency. The replacement algorithm determines the pages which are to remain in the main memory and those which are to be removed from the main memory if space is to be freed in it. The model employed is for generating system-independent access routes to a paged memory and imitates the behavior of actual programs. Three replacement algorithms currently employed are examined: random replacement, whereby if a page is addressed which is not in the buffer then the page to be replaced is selected at random from pages in the buffer; first-to-come, first-to-go replacement, whereby the page is replaced which has been in the buffer longest; and most-recently-employed page replacement, whereby the page is replaced among the pages in the buffer which has been used most recently. A Markov model of program behavior is employed, in which addresses to pages are described by a finite ergodic Markov chain with a known transposition probability matrix. The principles for constructing a model for generation of system-independent access routes to the memory with different types of computer system architecture and different program structures are derived from an earlier published paper (Thorington, J. M., Jr. and Irwin, J. D., "An Adaptive Replacement Algorithm for Paged-Memory Computer Systems," IEEE Trans. Comput., 1973, C-2, N 10, 1053-1061). In the process of modeling, a program with a specific structure is created and the process of running this program is simulated. The numbers of program pages which are addressed represent a route of access to the memory. Page numbers are arrived at through very simple arithmetic operations on the actual instruction and data addresses of the program. A graphic representation is given of the frequency of page malfunctions as a function of the capacity of the memory for several algorithms of hierarchical class "H" and for a random substitution algorithm for specific programs. It is demonstrated that algorithms of class "H" result in considerable reduction in the number of page malfunctions as compared with the random substitution algorithm. Class "H" algorithms do not require knowledge of a priori information and make it possible substantially to lessen the portion of the memory to be set aside for a specific program. Figures 6; references 5: 3 Russian, 2 Western.

USSR UDC 681.3.06.614

STATE STANDARD "THE PROGRAMMING LANGUAGE COBOL"

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 19-24
manuscript received 20 May 1977

YUSHCHENKO, YEKATERINA LOGVINOVNA, corresponding member, Academy of Sciences, UkrSSR, Cybernetics Institute, Academy of Sciences, UkrSSR (Kiev)

[Abstract] The paper discusses problems and unification and standardization of programming languages and language standard requirements, as well as the principal characteristics of COBOL language, which is oriented to a wide class of data processing problems. In the USSR the first work on unification of programming language was the creation of a minimum matched COBOL in a Russian version. The proposed COBOL version served for a while as a starting point during creation of a number of translators for COBOL, for "DNEPR-21," "MINSK-22," "MINSK-32", "RUTA-110," and other electronic computers. The first step in the direction of standardization of programming languages in the USSR was the approval by the State Committee of Standards of the Council of Ministers, USSR, of the standards "Programming Language ALGAMS" (Subset ALGOL-60) in 1976, and "Programming Language COBOL" in Russian and English versions in 1977. The Russian version of the standard COBOL was developed by the collective of workers of the Cybernetics Institute of the Academy of Sciences, USSR, under the supervision of Corresponding Member of the Academy of Sciences, UkrSSR, Ye. L. Yushchenko, with participation of the Scientific-Research Institute of Electronic Computers (Minsk) and the Novosibirsk Branch of the Institute of Precision Machanics and Calculating Techniques of the Academy of Sciences, USSR. The standard was approved 18 Jan 1977 with a 5-year period and enters into force from 1 Jul 78. The paper also discusses the overall characteristics of COBOL, the problem of machine independence of programs based on COBOL, the modular structure of the language, typical procedures and description in COBOL, viability of COBOL, problem-oriented resources of standard COBOL, development of COBOL, and the structure of standard COBOL. References 5: 2 Russian, 3 Western.

USSR UDC 681.3.51./6.42

COMPUTATION PROCESS ORGANIZATION ON ELECTRONIC COMPUTERS ORIENTED TOWARD ALGORITHMIC PROGRAMMING LANGUAGES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 34-39
manuscript received 27 Jul 76

BOYARCHENKOV, MIKHAIL ALEKSANDROVICH, dr in technical sciences, INEUM [Institute of Electronic Control Machines, Academy of Sciences, USSR] (Moscow) DECEASED; ZONIS, VLADIMIR SEMENOVICH, engineer INEUM (Moscow); RODIONOV, VLADIMIR VLADIMIROVICH, engineer, INEUM (Moscow); TARASOV, MIKHAIL NIKOLAYEVICH, engineer, INEUM (Moscow) and SHUMEY, ALEKSANDRA SERGEYEVICH, candidate in physicomathematical sciences, INEUM (Moscow)

[Abstract] The paper considers the computation process organization on an electronic computer oriented toward the algorithmic programming languages. The computation process is divided into two stages. At the first stage a syntactical analysis and a recording of the initial program based on algorithmic language into machine language is made, during which there is a direct agreement between the programs presented based on the initial and machine language. At the second stage a semantic accomplishment of the program based on machine language is performed. Efficient fulfillment of both stages is assured by a selection of suitable algorithms for the syntactical analysis and semantic accomplishment. The paper uses the method of LR(K)-grammar for construction of the algorithm for syntactical analysis, and the method of ratios of precedence for the algorithm for semantic accomplishment. Tables 5; references 11: 9 Russian, 2 Western.

USSR UDC 681.3.06.62

USE OF ALGORITHMIC LANGUAGES COBOL AND FORTRAN-IV FOR SOLUTION OF AUTOMATED ENTERPRISE MANAGEMENT SYSTEM PROBLEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 39-42
manuscript received 17 Aug 76; after completion, 17 Jan 77

DELGOV, ALEKSANDRA NIKOLAYEVICH, engineer, "Krasnyy Gidropress" Plant (Taganrog)

[Text] During the programming of complex automated enterprise management system (ASUP) problems, the combined use is proposed of two algorithmic programming languages: COBOL and FORTRAN-IV, which is accomplished on the base of a disk operating system DOS YeS [unified system]. Limitations superposed onto the complex program are shown. A standard subprogram based

on ASSEMBLER language is offered for organization of interprogramming connections. The work described was performed on a YeS-1020 electronic computer with the use of the operational system DOS YeS version 1.3. Figures 2.

USSR UDC 681.3.06./94

AUTOMATED MULTIPROGRAMMING DATA PROCESSING SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 43-46
manuscript received 18 May 77

BAGDONENE, DANA POVLOVNA, engineer, Vil'nyus Branch of ENIMS [Experimental Scientific-Research Institute of Metal-Cutting Machine Tools] (Vil'nyus) and SERGIYENKO, IVAN VASIL'YEVICH, dr of physicomathematical sciences, Institute of Cybernetics, Academy of Sciences, UkrSSR (Kiev)

[Abstract] The CENTRAS automatic data processing system [ASOD TSENTRAS] was developed in order to furnish a complex solution to the problem of efficient organization of computing operations and control of a data processing center. CENTRAS has a specialized operating system (OS) which provides automatic determination of the expenditure of resources of a multiprogrammed computer on each problem solution, and accumulates and classifies data concerning the problems which are solved as well as operation of system devices. The economical effect of ASOD TSENTRAS is increased in the case of interconnection of several "MINSK-32" machines into a system for their combined operation. Interaction of the machines in a system amounts to an exchange of information among the machines. In this case statistical information concerning problems being solved and concerning operation of the machines of the system is stored on one magnetic tape. The ASOD TSENTRAS is applied to the "MINSK-32" electronic computer. Additions to the operating system take up 1000_8 cells. The overall capacity of the system is 135 thousand machine words. The ASOD TSENTRAS can also be used by a computing system (VS) which consists of electronic computer of unified system (YeS) type. The procedure for determining the expenditure of resources of a computing system for solution of problems is not changed. During program realization of additions to the operational system, the structure of the peripheral units table is taken into account. ASOD TSENTRAS is incorporated into the Vil'nyus Territorial Computing Center (TVTs) and the Vitebskiy Multiple-User Information Computing Center (KIVTs). Figures 1; tables 1; references: 12 Russian.

USSR UDC 681.3.06./91

ALGORITHM FOR ARRANGEMENT OF FILES IN EXTERNAL MEMORY DEVICES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 46-50
manuscript received 2 Oct 76

KIRPICHNIKOV, VICTOR MIKHAYLOVICH, candidate in technical sciences, Minsk Radio Engineering Institute [MRTI] (Minsk) and RUDENKO, ANATOLIY PROKOP'YEVICH, engineer, Ural Electromechanical Plant (Sverdlovsk)

[Abstract] The paper describes an algorithm for arrangement of files in external memory devices with direct access (ZUPP). The algorithm is directed towards minimization of the number of access operations to the ZUPP. This is done by an efficient arrangement of data units throughout. A block diagram of the algorithm for redefinition of the composition of "equally accessible" areas for arrangement of a file is presented, and the functions of the individual blocks of the diagram are explained. Figures 1; tables 6; references: 3 Russian.

USSR UDC 681.3.06.4

DIRECTED LOOK-UP IN ENTRIES WHICH HAVE A TABULAR FORM OF PRESENTATION

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 50-54
manuscript received 26 Sep 76; after completion 8 Apr 77

YARMOSH, NIKOLAY ADAMOVICH, candidate in technical sciences, Institute of Technical Cybernetics, Academy of Sciences, BSSR [ITK AN BSSR] (Minsk) and DOVNAR, NINA ALEKSANDROVNA, engineer, ITK AN BSSR (Minsk)

[Abstract] The table considers one form of the tables of factual information--tables symmetrical with reference to the structural arrangement of their arguments and functions. A block diagram of an algorithm of directed look-up is presented and the functions of the individual blocks of the diagram are explained. The algorithm is realized on a YeS-120 electronic computer with use of the programming language FORTRAN-IV and the disk operating system DOS YeS [unified system]. The algorithm can be useful during development of automated systems of information means [ASIO] in branches of machine building and instrument making. Figures 1; tables 1; references: 2 Russian.

USSR UDC 621.3.06:51

OPERATION OF PROGRAMMED SYSTEM OF MATRIX OPERATION IN AIRBORNE DIGITAL COMPUTER

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977, pp 70-74
manuscript received 28 Jan 76 after completion, 25 May 77

TOMSHIN, VLADIMIR KONSTANTINOVICH, candidate in technical sciences, Moscow and KARCHENKO, VALERIY MIKHAYLOVICH, engineer, Moscow

[Abstract] The paper investigates the overall program of organization of programmed systems of matrix operation in airborne digital computer [BTsVM] with a fixed point, reveals the basic principles of construction of such systems, describes the system of procedures of the matrix algebras, realized with one BTsVM, and presents the accuracy and time characteristics of the individual matrix operations. Particular attention is paid to methods of conversion of matrixes in regimes with fixed and floating points. Normalized matrixes and scaling coefficients of matrixes are introduced for overcoming difficulties connected with scaling. All procedures of the matrix algebra can operate both with single and double matrixes. The precision of double matrix operations differs but little from the precision of operations fulfilled on an electronic computer. The characteristics are presented of the system of procedures of the matrix algebra realized on one airborne digital computer. The system of procedures of matrix algebra for a BTsVM with a fixed point, constructed on normalized matrixes, has the following advantages: 1) It completely frees the users from scaling of all matrix operations; 2) It possesses high precision and makes it possible to organize a flexible computing process; and 3) Programming of matrix operations is conducted at the level of an autocode. Figures 1; tables 2; references: 2 Russian.

USSR UDC 65.015.11

ELABORATION OF RECOMMENDATIONS ON DESIGN OF ELECTRONIC COMPUTER ORIENTED TOWARDS ONE CLASS OF ALGORITHMS FOR RETARDED CONTROL OF OBJECTS

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977, pp 92-97
manuscript received 29 Nov 76; after completion, 9 Mar 77

KONDRAT'YEV, VYACHESLAV VASIL'YEVICH, dr in technical sciences, Gor'kiy Polytechnical Institute (Gor'kiy) and IVANOV, ANATOLIY PAVLOVICH, Gor'kiy Polytechnical Institute (Gor'kiy)

[Abstract] During planning of high-speed machines, problem-solving orientation of electronic computers occupies an important place. During this, even

at the system and algorithmic stages of planning, it is useful to produce some recommendations for construction of the operational and memory devices of computers, and to estimate the time of realization of algorithms of a given class as a function of their parameters. The present paper considers one of the sufficiently general-purpose algorithms of discrete control of technological processes--an algorithm of discrete control with a periodic regime of distribution of retarded control actions of multiconnected objects. An analysis of the algorithm and choice of the basic system, a determination of the time characteristics of the algorithm and recommendations with respect to the organization of the memory of an electronic computer under consideration are presented. Figures 3; references: 8 Russian.

USSR UDC 681.3.48./64

PRINCIPLES OF CONSTRUCTION OF AN AUTOMATED MICROPROGRAMMING SYSTEM

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977 pp 111-117
manuscript received 8 Apr 77

ZABARA, STANISLAV SERGEYEVICH, candidate in technical sciences, PTO BYM [Production and Technical Department. Computing and Control Machines] (Kiev)

[Abstract] General problems of preparation of microprograms with the aid of an electronic computer are considered. The principal features are described of an automated system for planning of microprograms [ASPROM], intended for solution of problems of designing the control memory of a large number of devices with microprogram control. The paper discusses the independence of the system from a microprogrammed base, microprogramming language, comparison of ASPROM with systems of programming automation and systems of designing circuit equipment, three-level adjustment of the system, and the invariance of the system in the area of use. The first phase of the ASPROM-1 system is programmed for the DOS ASVT [disk operating system--integrated system of computing techniques] M4030 machines. The program means of the ASPROM-1 amounts to about 20 thousand operations of ASSEMBLER language. The FOROS language and system are used for simulation. The ASPROM-1 system was introduced into production of the "Elektromash" Association and was used for microprogramming a device for control of accumulators based on magnetic disks [UUNMD], and the M4030 electronic computer. The overall characteristics of the corresponding microprogram bases are shown in a table. At present, adjustment of a system based on microprogramming of a family of minimachines for a system of small electronic computers [SM EVM] is in progress and development is being conducted on a second phase of the system [ASPROM-2]. The work is being fulfilled under the scientific direction of the author by a group of coworkers of the Scientific-Research Institute of Peripheral Equipment. Figures 2; tables 1; references 18: 12 Russian, 6 Western.

USSR UDC 331.876

NEW DEVELOPMENTS IN DATA PROCESSING EQUIPMENT AT PRODUCTION ASSOCIATION "TEPLOKONTROL"

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian ("On the Road of Effectiveness and Quality") No 9, 1977 pp 3-5

IVANYSHIN, N. S., general director of the "Teplokontrol'" Production Association

[Excerpts] By decree of the 25th Party Congress, the grand panorama of our country's new stage of life appears before the Soviet people in all its splendor. The ninth five-year plan became the strong foundation of subsequent advances. The workers of the Kazan Order of the Labor Red Banner Production Association "Teplokontrol" (expansion unknown) completed it worthily...

The association's collective is constantly working on the development of the ASUP [automated enterprise management system]. The number of problems solved by the information and computation center[IVTs] has greatly increased, and the level of mechanization of calculation control work has reached 50 percent. Two second-generation electronic computers are in operation at the IVTs. In 1976 the third-generation electronic computer complex M-4030 and the automatic plotter "Itekan-2M" were installed. There are three punch card computer systems, four sorters, 45 peripheral technology complexes, and more than 140 units of various auxiliary equipment.

With the aid of the computer one can solve problems concerning technical and technological preparation for production, operational production and technical-economic planning, material-technical supply, sale of ready-made products, personnel turnover, and accounting. Now we are learning to solve a large volume of problems on the M-4030 computer with the use of packets of applied programs and a data bank. This allows for obtaining the required information more effectively and accurately for significant expansion in the range of problems solved in the area of production control, and increased effectiveness.

USSR

PROGRAMMING TOOLS FOR AUTOMATED DESIGN SYSTEMS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, Sep/Oct 77 p 110

[Review of book "Matematicheskoye obespecheniye avtomatizirovannykh sistem proyektirovaniya elektro- i radiotekhnicheskikh ustroystv" (Software for Automated Systems for Designing Electronic and Radio Devices), Ukrainian Republic Collection of Algorithms and Programs]

[Text] The Ukrainian Republic Collection of Algorithms and Programs is publishing the compilation "Software for Automated Systems for Designing Electronic and Radio Devices." At the present time seven installments of this compilation have been published. The eighth installment of the compilation has been prepared for printing and will be published in 1977.

The compilation contains algorithms and descriptions of programs for calculating electromagnetic fields in electronic and radio devices. These algorithms and programs were developed at the Cybernetic Institute of the Academy of Sciences, UkrSSR, under the direction of professor O. V. Tozoni, on the basis of new methods for calculating electromagnetic fields adapted for computers and intended for automating the design of various components of electronic and radio devices.

The programs are written in the ALGOL-60 and FORTRAN languages with the use of the software of the DUBNA monitoring system. With the aid of these programs it has been possible to solve new problems in the calculation of electromagnetic fields in electronic and radio devices. In the seventh installment algorithms for calculating plane-parallel and three-dimensional magnetic fields in nonlinear and heterogeneous media are presented. There are also included improved algorithms and programs for calculating multiphase industrial conductors. The eighth installment of the compilation will include algorithms for calculating electromagnetic processes in metal plates which are moving in relation to a coil carrying a current, algorithms for calculating three-dimensional magnetic fields in extended electronic devices and others.

In calculating electromagnetic fields and high-frequency circuits for the solution of integral equations, auxiliary routines are required. For this reason standard programs for computing simple, double, triple and surface integrals and standard programs for solving high-order algebraic systems with completely filled matrices with real and complex coefficients are included in the compilation.

The compilation is published in Russian.

Orders with indication of the number of copies of individual installments of the compilation required should be sent to the address: 252207, Kiev-207,

40th Anniversary of October Prospect, 142-144, SKB MMS Cybernetic Institute, UkSSR Academy of Sciences, Ukrainian Republic Fund of Algorithms and Programs.

USSR

UDC 65-501.5

DEFINITION AND DESIGNATION OF TOLERANCES ON PARAMETERS OF CONTROL SYSTEMS

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian No 6, Nov/Dec 77 pp 100-109 manuscript received 10 Apr 75

ZDOR, V. V., Vladivostok

[Abstract] Tolerances on parameters of a control system are defined and designated here on the premise that: 1) There exists a nonnegative performance criterion which adequately characterizes the system and is a function of its parameters, 2) There exists a nominal design of this system which satisfies this performance criterion, 3) Only a limited performance deterioration in service can be tolerated, and 4) The tolerable departures of the performance indexes within the parameter space determine a connected region D of tolerable parameter variations. Defining the tolerances reduces to a construction of this region so that the performance characteristics of the design remain applicable at all corresponding points within this region, that the nominal design lies in this region, and that all realizations in this region are equally satisfactory. Designating the tolerances reduces to an approximation of this region with a rectangular block. The second problem is more difficult and several methods of solution are offered here, according to algorithms based on: Lagrange multipliers, mathematical programming, point "stretching", or diagonals. The resulting performance contours, i.e., the two boundaries minF and maxF of a criterion F as a function of a combination (product, ratio, weighted sum, or any other) of two original parameters has certain properties which thus also characterize the region D and which lead to analytical relations for these performance contours as well as for the coordinates of the approximating rectangular block. Figures 4; references 6: 5 Russian, 1 Western.

USSR UDC 512.251.26

OPTIMIZING THE STRUCTURE OF AN APPLICATION PROGRAM PACKAGE FOR REAL-TIME DATA PROCESSING

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian No 6, Nov-Dec 77 pp 110-115 manuscript received 23 Feb 76

MIKHAYLOVA, N. I., Moscow

[Abstract] Simultaneous solution of several problems on a computer limits the memory capacity available to each, which makes it worthwhile to optimize the structure of application program packages for real-time data processing. Optimization means here minimization of the computer time under given limitations. The problem is similar to problems of calendar scheduling or resources distribution, but differs from those insomuch as the possibility of aggregating operation which follow in a specific sequence exists. This minimization problem is formulated here mathematically for solution by the method of dynamic programming. The computation effort according to the algorithm developed here depends on the number of transitions from one phase state to another, this number corresponding to the size of the set of permissible such states. The method has been applied in practice. Not only the condition determining the minimum memory capacity which can be assigned to a system is given but also the condition determining the maximum memory capacity beyond which a further increase ceases to be worthwhile. Figures 1; tables 1; references 8: 4 Russian, 4 Western.

USSR UDC 007.52

"DISTAL"--LANGUAGE AND SYSTEM FOR SIMULATION OF LOGIC-DIFFERENTIAL SYSTEMS WITH DISTRIBUTED PARAMETERS

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian, No 6, Nov-Dec 77 pp 116-125 manuscript received 12 Jan 76

LOGVIN, V. V. and PERCHUK, V. L., Vladivostok

[Abstract] An s-system, i.e., a logic-differential system with distributed parameters, consists of three interfacing subsystems which in the mathematical model are respectively described by sequential equations (the discrete subsystem), ordinary differential equations (the continuous subsystem), and partial differential equations (the continuous subsystem with distributed parameters). Inasmuch as the structure of such an s-system can vary with time, it is appropriate to subdivide these subsystems respectively into logic, differential, and functional blocks with fixed structures. DISTAL is the language for simulating such an s-system on a

BESM-6 high-speed digital computer, based on both the MUL'TITRANS multi-language programming system and the DUBNA operational system, structurally similar to FORTRAN. The various blocks and an automat describing any changes in the s-system structure are shown here in the DISTAL language. For illustration, a computer program is also written in this language for a typical boundary-value problem in heat conduction which involves a medium and a body moving inside it. Figures 1; references 8: 7 Russian, 1 Western.

HUNGARY

TRANSLATION OF TASK-ORIENTED LANGUAGES WITH THE MP/0 MACROPROCESSOR

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 46-51
manuscript received 28 Jun 77

FABOK, JULIANNA, and LAUFER, JUDIT, staff scientists, MTA SZTAKI [Research Institute for Computer Technology and Automation, Hungarian Academy of Sciences]

[Abstract] The MP/0 macroprocessor was developed for language expansion and various kinds of software development; it may be used for translating simple task-oriented languages. For the translation process, the commands of the source language are recognized, semantically processed, and the command sequence of the target language is issued (coding). The macroprocessor reads in lines from the input; the lines may be text lines or directives. The processor processes the text lines and outputs text line(s). The directives alter the inner state of the processor. After a brief description of the MP/0 macroprocessor (which is capable of language extension, translation, bending, and standardization), the authors present two examples: (1) translation of the DDC control language (which is to illustrate the writing of the control programs for computer-aided control of discrete processes) and (2) Backtrack FORTRAN implementation. The MP/0 permits the easy and fast implementation of task-oriented languages, and is extensively modifiable. Its limitations do not affect significantly the convenience of the task-oriented language. Figures 3; references 7: 4 Hungarian, 3 Western.

HUNGARY

THE CDL2 LANGUAGE SYSTEM OF THE ANSWER OPERATING SYSTEM

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 24-28
manuscript received 31 Oct 77

LANGER, TAMAS, staff scientist, SZAMKI [Computer Technology Coordination Institute]

[Abstract] The target program SZKCP CF-31 [Target Program 31 of the Computer Technology Central Target Program] provides for the development of the ANSWER operating system aimed at improving software development. It employs the CDL2 programming language. The goal of the ANSWER operating system is to provide a tool for experienced system programmers in large software-development institutions, and features portability and interactivity to allow development (improvement, startup, debugging, and the like) using a single, high-level language. The CDL2 language is a direct development from the CDL

[Compiler Description Language], wherein the algorithms to be realized are expressed by subroutines to obtain the elementary algorithms defined by macro (open) subroutines by upward refining steps. The ANSWER and CDL2 are briefly described. So far, the overall concept of the ANSWER has been completed. The CDL2 was simultaneously also developed at the CDL2 Laboratory of the Technical University of West Berlin and the Computer Application Research Institute. At the present time, CDL2 translation programs operate in Hungary on R-22, IBM 370, and Siemens BS2000 computers. Figures 3; references 19: 6 Hungarian, 1 German, 12 Western.

USSR

DEPARTMENTAL HOLDINGS OF ALGORITHMS AND PROGRAMS

Moscow NA STROYKAKH ROSSII in Russian No 1, Jan 78 p 17

[Text] In the software section of GIVTs [Main Information-Computing Center] of USSR Minpromstroi [Ministry of Industrial Construction], the IVTs [Information and computer center] functions as the departmental holding [Fond] of algorithms and programs (VFAP). It gathers information on developments in branches, conducts expert examination and reception of developments, carries out testing of programs on control samples, organizes storage for materials received, informs organizations about the composition of the holdings and modified programs, follows-up on their adoption and development by performing the collection and systematization of variations in program operation and so on.

The VFAP is also proving to be a methodological and consultative aid in the formation and management of holdings of algorithms and programs in subdepartmental IVTs's. At the end of a year it will deliver a complete list of data included in the VFAP to the branch holdings of algorithms and programs of the Gosstroy, USSR.

For all the diversity of the problems before the departmental holdings at present, principal attention is centered on a special study of the developments themselves and on the identification and selection of the highest performing and most promising of them. Solutions which might be adopted in many management areas are of the greatest value. The goal in identifying this type of solution is to cut down on the time needed for automated management-system [ASU] development, to reduce costs and to increase the scientific and technical level of the systems.

An example of this type development is the information-reference system " "ASOI-Tula" received not long ago in the VFAP (developer--the IVTs of the Main Administration of the Capital Construction Department, Tula). Well formulated as a problem, the procedure of data access permits the preparation and acquisition of references from various groupings and combinations of information.

The ASOI-Tula software, which is composed of an applied program package, is constantly being improved. At the present time its third editing has been done. A special training school has been set up in Tula to teach its use. In this way organizations may receive active methodical and practical help in adopting it.

If industry is to convert to using unified system of electronic computers in ASU's, the holdings must solve the problem of organizing acquisition and accelerated distribution of software for these machines.

USSR

COLLECTION OF PROBLEMS OF AUTOMATED MANAGEMENT SYSTEMS IMPLEMENTED ON UNIFIED SYSTEMS OF ELECTRONIC COMPUTERS

Moscow NA STROYKAKH ROSSII in Russian No 1, Jan 78 p 17

VASILENKO, P., chief specialist, TsNIPIASS [expansion unknown]of Gosstroy USSR

[Text] So that developers and users might become more widely familiar with problems of automated management systems (ASU) run on third generation electronic computers (EVM), TsNIPIASS of Gosstroy USSR, has issued in 1977 "A Collection of Problems for ASU's in Construction, Implemented on Unified Systems [YeS] of Electronic Computers" which contains information on 52 problems completed, adopted or being adopted in 1977 in the construction and transport industries.

In the collection the problems are grouped into 12 ASU subsystems: scientific and technical progress management; technical and economic planning; operational management of contract work and production of projects and operating capacity into operation; internal capital construction managements, management of material and technical procurement; industrial production management; machine operations management; transport management; planning, accounting and analysis of personnel; bookkeeping; planning operations management; and general system software.

However, classifying problems with these or other subsystems is conditional because some problems are found to overlap two or more subsystems. The concepts of the problems are conditional to a significant degree, inasmuch as in many cases we are talking about large program packages which carry out rather large and intricate formulations. The content of a problem in each specific case may determine the description which is cited in the collection.

The collection is based on data sent to TsNIPIASS by particular management-developers in the form of answers to the following questions:

1. The designation of the problem (problem package), subsystems, systems.

2. Brief characteristics. The problem function. Input and output data, operating order, optimization criteria and restrictions.

3. Management-developer, authors. Address and telephone.

4. Availability of materials (statement of the problem, algorithm, program description, test sample, input and output forms, sample programs and instructions).

5. Stage (TZ [technical task], TP [technical regulations], RP [distinctive attributes], introduction, operation). Programming language. Solution rate, computation time.

6. Information on the practical application of problems (the name of the organization where the problem has been introduced, the time of operation onset).

7. Technical and economic indexes (at the stage of development and adoption--the expected effect, at the operating stage--the actual effect; in case it is impossible to determine the quantitative effect, the qualitative effect is to be indicated.)

8. Other information (shortcomings, observations, suggestions and so on).

At the present time TsNIPIASS is preparing a second collection. Its publication will permit the elimination of duplication and the reduction of time and expense in developing programs for solving various management problems, thereby permitting an increase in the efficiency of construction work.

To include new developments in the second issue, users and developers of ASU's in YeS EVM's are asked to send data in the form of answers to the preceding questions to this address: 117393, Moscow, GSP-312, Noviye Cheremushki, section 28, building 3, TsNIPIASS. Telephone: 128-97-25.

USSR

NEW ALGORITHMS AND PROGRAMS FOR ELECTRONIC COMPUTERS

Moscow NA STROYKAKH ROSSII in Russian No 1, Jan 78 p 18

[Text] New algorithms and programs for electronic computers [EVM] in the construction industry have appeared in the industrial and information holdings of TsNIPIASS [expansion unknown],Gosstroy, USSR

AKKORD. PROGRAM PACKAGES "DEL'TA" AND "SIGMA" FOR SCHEDULING SUBSYSTEMS

Automation of Control and Coordination of Optimum Production Routines (AKKORD) is intended for the production and analysis of optimum technical and economic on-going and operational plans for multistage engineering projects in the general contracting trusts (special construction management) for industrial, power and special construction and in planning and design organizations.

AKKORD may also be applied to industrial enterprises during planning for the beginning of new products production, the development of specific prototypes of complex and unique products and in all other cases where it is necessary to accomplish practical results in a project which involves a system of a nonrepetitive type.

Initial data:

the division of all construction projects of an organization into two groups;

network models of all the projects of an organization;

information on the on-going and future availability of resources in an organization;

assigned (directed) time for completing projects of the first group;

scheduled dates for beginning to carry out projects of the first group;

order of priority for accomplishing projects of the second group.

The first phase of AKKORD includes:

scheduling (volume of production in actual measurements and scheduled deadlines for its accomplishment)--programs "Del'ta" and "Omega";

planning for labor resources--program "Sigma";

planning for material and technical resources in greater capacity--program "Sigma";

planning for material and technical resources in an inventory--program "Gamma".

Management-developers: the Institute of Hydrodynamics of the Siberian division of the Academy of Sciences, USSR and a number of institutes and coexecutors.

Program packages "Del'ta" and "Sigma" which have been developed for the Minsk-22 EVM and may be used on the "Minsk-32" EVM (in a compatible operation) are included in the holdings (fond) of algorithms and programs for EVM's (numbers 111-74 and 111-77).

Information about the instructions for using the algorithms and programs included in the holdings may be obtained at the following address: 117393, Moscow, GSP-312, Noviye Cheremushki, section 28, building 3, TsNIPIASS. Telephone: 128-97-01. Teletype: 111850.

HUNGARY

PROGRAM SKELETON FOR SOLVING PROBLEMS IN THE FIELD OF STATICS

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 29-33
manuscript received 8 Jun 77

SZABO (Mrs VASARHELYI), ANNA, program designer, and SZOTS, MIKLOS, SZAMGEP [expansion unknown]

[Abstract] The program skeleton, developed for solving finite-element type problems, is based on two considerations: (1) To divide the task into elements and provide an approximating solution from the superimposition of a few basic functions of which the coefficients are unknown and are linear functions of the members of the differential equations causing inhomogeneity (descriptive matrix or, in the case of dynamic systems, the rigidity matrix); and (2) To prescribe conditions for the configuration of the elements based on the solution functions, to be written on so-called nodal points of the elements. The connection conditions are described by superimposition of the matrixes characterizing the elements. In order to perform the computations required, the background memory must be used extensively because of the large amount of data involved. It was assumed that repetitive elements will be formed in the course of division into elements. Although the programs generated with the help of the skeleton are not so efficient as the programs written specifically for a given task, the programs can be changed quickly, very complex structures can be handled, and novel approaches (new types of finite elements) can be researched with them. Figures 9; references 6: 4 Hungarian, 2 Western.

II. ECONOMIC APPLICATIONS

A. Bloc Cooperation

USSR

MUTUAL ASSISTANCE IN COMPUTER PRODUCTION

Moscow OGONYEK in Russian ["A Small Portion of a Memory"] No 12, Mar 78 p 3

KALINICHEV, S., special correspondent, Ogonyek

[Text] Bozhidar Koyev was born in Chirpan which is a small city in the southern ranges of the Bulgarian Sredna-Gory [central mountain chain]. During the initial postwar years there was a single enterprise here in which one and a half dozen workers manufactured plows and hoes. Now, however, they were introducing the engineer Koyev to me as one of the most experienced specialists in the electronic computer technology field.

"To our way of thinking, I am one of the oldest specialists," he told us. "Even while I was studying at the institute in Sophia I knew that a memory devices plant was being constructed not far from Chirpan in Stara Zagora. The air here is like glass, the water like crystal. These are ideal conditions for a very critical industry. I was graduated from the institute in 1969 and came here to work."

The memory devices plant in Stara Zagora was constructed as one of the enterprises of the IZOT firm which is a state economic association. About ten enterprises, a design bureau and a scientific-research institute in Sophia are parts of it. It was assumed beforehand that the plant would supply memories for all of the SEV [Council for Mutual Economic Aid] countries.

I first saw the Stara Zagora memory blocks with the IZOT emblem in Kiev at a computer and machine control plant. Anatoliy Mel'nichenko is the same age as Bozhidar and also progressed from debugger to the head of a top-level department. Speaking of the new third generation M-4030, he explained:

"We are fabricating what is basically the heart of the machine and doing the final debugging and adjusting the whole assembly. But Bulgaria, Hungary, Czechoslovakia and Poland supply the individual units. Bulgarians, for instance, supply the tape drive mechanisms, while disk storage units involve a different sort of equipment."

Finding myself in Stara Zagora I decided to find out more precisely of what these memory units weremade. Bozhidar showed me a stack of discs similar to phonograph records. They were threaded on spindles in such a way that there were gaps left between them. In these gaps there are readers which locate in a thousandth of a second the exact point where the information needed at a given moment has been recorded.

"How much information can be recorded on this kind of disc set up?" I asked.

"Seven megabytes." he replied. And explained: "Seven million characters. But we are already converting to issuing memory blocks with a twenty-nine megabyte capacity. In electronics technical innovation takes place very rapidly. The engineers and assemblers (and in this industry almost all of the assemblers are engineers) from Stara Zagora pay visits to Kiev, Brest, Minsk and Moscow. This helps us to solve the majority of technical problems promptly."

Alexander Tushinskiy, with whom I became acquainted in Minsk, gave an illustration of this kind of relationship.

"When we were testing and beginning production on the YeS-1020 we invited the Bulgarians. This is a joint effort of our NIIEVM (?Scientific Research Institute of Computers) and IZOT. And after some time they were also putting together this kind of machine at their plant in Sophia. They sent an invitation: Come; we will test it together. So we assembled here and made the trip. They gave us a very nice welcome. But for some reason they were in no hurry to invite us to the plant. At last we found out that the machine was not yet ready to be tested. Why, they were entertaining us while they got their machine going with a complete set of our, Minsk's, peripherals! More accurately, the machine was assembled and debugged at our plant in Minsk and Bulgarian memory units were put into it along with Polish printers and a number of components from the GDR. We went to the plant, donned coveralls and began to tune up the machine together."

In Sophia I happened to talk with the Deputy Chairman of the Bulgarian State Planning Committee Comrade Georgiy Georgiyev.

"For a small land such as ours," said Comrade Georgiyev, "socialist integration opens up a great opportunity. It is uneconomical and most often impossible for one state to build an up-to-date machine, an atomic reactor, an electronic machine and so on. The international division of labor increases productivity, makes it possible for small countries to participate in the development of their own progressive equipment and augments their staffs of teachers, engineers and workers. During the past Five-Year Plan we have actually developed a very promising electronics industry."

PHOTO CAPTION

Electronic computers developed through the combined efforts of our countries operate in the computer center of the Agroindustry Association imeni G. Dimitrov. Photo not reproduced.

USSR UDC 658.4

CONTROLLED EXPERIMENT IN CONTROL SYSTEMS FOR SOCIO-ECONOMIC PROCESSES

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian No 6, Nov-Dec 77 pp 59-64 manuscript received 25 Nov 75

MEDVEDEV, B. G., Moscow

[Abstract] Control of socio-economic processes is based on planning. The KURS automatic management system (ASU) for this purpose has been simulated on a computer, in the form of a dialogue kind of procedure involving the planner and the models. Dealing with the distribution of residential dwellings, it takes into account that the amount of dwellings made available within a given year is fixed, that the total annual and long-range demand for dwellings exceeds the amount scheduled for distribution, that the demand is sufficiently high to make a solution by nonautomatic planning unfeasible, that inclusion of applicants in a plan is subject to priorities as well as restrictions, and the solution to such a planning problem for an entire city must satisfy the need of each applicant within a dwelling structure defined in terms of basic necessity for real people. Two groups of planning models are considered and analyzed here: one group involves planning the distribution of the total resources on an annual basis, another group involves planning on a quarterly basis and securing better choices. The problem of citywide planning is solved with the aim of bringing the residence closer to the work place. The computer program is designed so as to allow the planner to analyze and formulate the objectives, to develop several alternatives, to estimate and predict the growth of a city, and to thus enhance his professional reputation. References: 1 Russian.

USSR UDC 658.536.008:681.2

CENTRALIZED PLANNING AND ORGANIZATION OF TOOL PRODUCTION AT COMPUTER EQUIPMENT PRODUCING PLANTS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 2, 1978 pp 54-55

VOROB'YEV, V. A., engineer

[Text] The planning of the prospective development of tool production is based on discovering the plant requirement for equipment and tools and the volumes of in-house tool production in the enterprise tool shop. The requirement of the plant for tools for the planned period is determined by multiplying the normative demand times the commercial output of the enterprise. The proved indexes of the Five-Year Plan for development of tools production are the control figures for the enterprise when compiling the annual assignments for the tool shop. The centralized annual planning of

tool production operations consists in the development, agreement and approval by the subbranch enterprises of the annual assignments for tool production.

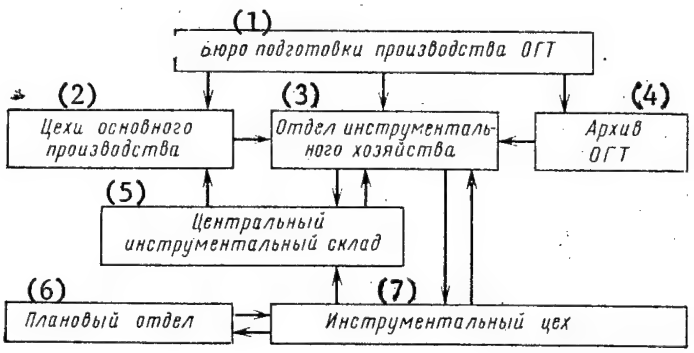
The annual tool production assignment developed on the basis of the Five-Year Plan is made up of a set of documents with five forms: 1) The title list on which the tool production assignment for the enterprise is indicated in overall volume indexes, expressed in terms of money and in labor expenditures; 2) The annual operations plan for the tool shop with respect to its basic indexes: the production output, labor and wages, cost of tool shop production and its components; 3) The nomenclature production plan of the tool shop determined by the basic production shop demand for process equipment and tools; 4) The form for calculating the required amount of technological process equipment and tools and the required production capacity of the enterprise tool shop; and 5) The annual assignment for the tool shop with respect to introducing new equipment and advanced processes. The annual assignment for the tool shop with respect to production volume can deviate to some degree from the control figures of the Five-Year development plan, for it depends on the plan established by the plant with respect to commercial production in the planned year. In such cases the annual assignment for the tool shop with respect to production volume is finally established considering the introduction of the correction factors into the calculations.

The quarterly cooperative information about the fulfillment of the established assignments presented by the enterprises to the main computation center of the branch and the statistical accounting regarding the development and introduction of new equipment permit the control and analysis of the course of the development of the tool production and they make it possible to adopt the corresponding measures with respect to planned growth of the production capacity of the tool shops and more effective utilization of this capacity. Along with controlling the course of development of the production capacity of the tool shops in the subbranch a great deal of attention is given to the application of the advanced technological processes and new materials for the manufacture of equipment and tools.

One of the factors influencing the efficiency of the activity of the tool production of the enterprise is a clear interrelation of the chief technologist's section and its subdivisions: the tool facility, the planning section and the basic production shops. A structural diagram of the organization of tool production at the majority of the plants of the VO Soyuschetmash Association is presented in the figure.

In the production preparation office of the chief technologist's section complex charts are developed and submitted to the responsible executive agents for the preparation for production of new products, the further equipment of the products in accordance with the measures aimed at lowering the labor involved in manufacturing the products, pointing up the work areas, replacement of existing equipment with more efficient equipment, and so on. The lists of equipment for all parts and assembly units are prepared here

and submitted to the responsible executive agents. The basic production shops present orders for the manufacture of equipment and tools to replace worn units monthly to the section (office) of tool procurement (OIKh). The equipment index, nomenclature and part numbers (assembly unit numbers), the products for the manufacture of which they will be used and the desired manufacturing deadlines are indicated in the orders.



Key: 1--Production preparation office of the chief technologist's section; 2--Basic production shops; 3--Tool production section; 4--Archive of the chief technologist's section; 5--Central tool warehouse; 6--Planning section; 7--Tool shop.

The tool procurement section (office) records the drawings for the new equipment and tools indicating the number of ordered sets and the user shops, it assigns the corresponding indexes to the ordered equipment, processes the shop orders for manufacturing the equipment to replace worn units considering the presence of equipment at the central tool warehouse, it fills out the orders and obtains the drawings for all of the equipment ordered by the shops in the archives of the chief technologist's section, it compiles the monthly operating plans in nomenclature and volumetric indexes and distributes them to the tool shop.

The archive of the chief technologist's section completes the design documentation for the manufacture of the new equipment and tools in accordance with the assignment of the chief technologist's section and submits them to the tool procurement section. The shops obtain and accept the equipment and tools from the central tool warehouse. Information is sent from here to the tool procurement section on the movement and presence of tools in the warehouse.

The planning section develops the plan with respect to the basic technical economic indexes for the planned period and forwards them for the information of the tool shop. The tool shop develops the process and establishes the norms for the operations performed with respect to manufacturing the

ordered equipment and tools; it manufactures the equipment and the tools in the established times, and it fills out the acceptance invoices and sends them to the central tool warehouse, the tool procurement section, bookkeeping, and the office for production preparation of the chief technologist's section; the equipment and tools are transferred to the central tool warehouse and the customer shops; monthly reports are compiled on the work done, and they are sent to the tool procurement section and the planning section of the plant. It is necessary to give attention to the fact that in some of the subbranch plants, in order to avoid excessive transshipments, the tools and equipment manufactured by the tool shop are transferred directly to the user shops with the documents filled out by the established procedure.

The work done in the subbranch with respect to creating a centralized planning and control system for the development of tool production will permit the tool production volume to increase by 10 to 12 percent annually as a result of better use of the available production capacity of the tool shops and the introduction of new equipment and advanced processes.

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C. Economic Control at Local Level

USSR

AUTOMATED MANAGEMENT SYSTEM IN MINISTRY OF TRADE

Moscow OSNOVY ASU V TORGOVLE (Fundamentals of Automated Management Systems in Trade) in Russian 1976 "Ekonomika" Publishing House, p 12

KOMAROV, A. A., LYUKSEMBURG, A. M., GORODISSKIY, F. G.

[Excerpt] In 1975 the first stage of an automated management system [ASU] was introduced in the USSR Ministry of Trade. The ASU utilizes the ministry's Main Information-Computer Center, which is equipped with a YeS-1020 computer.

USSR

UDC 53.072:681.3:336

A HEURISTIC MODEL OF THE DISTRIBUTION OF FUNDS FOR AUTOMATION MEANS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3, Jul/Aug 77 pp 1-5, manuscript received 10 Feb 77

GONCHAROV, V. A., engineer

[Abstract] A heuristic model has been developed for the distribution of funds for automation devices requisitioned by consumers in the republic by the Glavsnab [Main Supply Administration] UkrSSR. The model is based on the logic used in practical calculations now performed manually by Ukrglavkomplektavtomatik [?Ukrainian Main Administration for Automation]. This article presents a mathematical statement of the model and traces its functioning through the five main stages of its operation. This computer model can both reduce the quantities of manpower which must be spent on information processing and improve the quality of the plan for distribution of investments by the Supply Administration. The economy expected within the Ukrainian Administration for Automation is over 5 thousand rubles per year.

USSR

THE 60TH ANNIVERSARY OF THE OCTOBER REVOLUTION AND SCIENTIFIC AND TECHNICAL PROGRESS IN THE AUTOMATION OF MANAGEMENT

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, Oct/Nov/Dec 77 pp 1-3

[Editorial]

[Excerpts] At the present time, there are more than 2000 electronic computers [EVM] in use in the Ukraine, including 265 third generation unified series [YeS] and ASVT-M computers.

The basic principles of the creation of automated management systems [ASU] on the basis of modern electronic computers and other hardware for recording, collection, transmission, storage and processing of information were set down by Academician V. M. Glushkov in 1969.

At present, some 460 ASU of various types are in operation in the republic. By the end of the Tenth Five-Year Plan, there will be over 800 such systems.

Positive examples of the amortization of expenditures includes the creation of the ASU of the Boroshilovgrad Diesel Locomotive Plant under Mintyazhmash [Heavy Machine-Building Industry], USSR (amortization time 1.5 years, as against the standard of 2.9 years), the Kiev VUM Plant, under the "Elektronmash" Association of the Ministry of Instrument-Building, USSR (1.7 and 3 years, respectively), "Zaporozhtransformator" Production Association of the USSR Electrical Engineering Ministry (1.5 and 3 years), the Dnepropetrovsk Pipe Rolling Plant imeni Lenin of the Ferrous Metals Ministry, UkrSSR (1 and 3.3 years) and the Kherson Cotton Fabric Combine of the Light Industry Ministry UkrSSR (2.2 and 3 years).

The problem of integration of ASU and computing centers into a single republic-wide system, a component part of the All-Union system (OGAS) is an extremely complex problem from the scientific, technical and organizational standpoints, and requires a long period of time for its solution. During the Ninth Five-Year Plan, GlavNIIVTs, the Ukrainian State Planning Commission, UkrSSR, and the Institute of Cybernetics, Academy of Sciences, UkrSSR drew up rough plans for the creation of an automated system of collection and processing of information for accounting, planning and management of the national economy of the UkrSSR (RAS USSR), and also developed possible versions of a complex, goal-oriented program for construction of this system during the Tenth and subsequent Five-Year plans.

Based on these materials, and considering the corresponding assignements of the state plan and complex programs for further scientific and technical problems approved by the State Committee on Science and Technology, as well as the material, labor and financial resources allocated for the

introduction of computer technology to the economy in 1976-1980, the State Planning Commission, UkrSSR in cooperation with the ministries and departments, has formulated a territorial-branch (departmental) combined goal-oriented program of operations for the creation of the first section of RAS USSR during the current Five-Year plan.

The basis of the assignment of this task is the resolution of the 25th CPSU Congress concerning the introduction of computer technology to the national economy in order to provide for further development and to increase the effectiveness of ASU and computing centers gradually combining them into a single statewide system for collection and processing of information for accounting, planning and management. One important aspect of this program is the creation of computing centers for collective use. This decision has been given concrete form as applicable to the economy of the UkrSSR.

In connection with this, the program, in addition to the tasks related to the introduction of new and modernization of existing computer facilities, the creation of computing centers and ASU, development and improvement of ASU and computing centers, accomplishment of integration of ASUTP [automated management system for technological process] with ASUP [automated enterprise management system] ASUP with OASU [automated management systems for sectors of the national economy],OASU with systems at the republic level (ASPR [automated system of planning estimates], ASU-MTS [ASU--material-technical supply], ASOI-tsen [automated system of processing information on costs], ASFR [ASU for financial estimates]),by means of an organization of inter-machine exchange of information during solution of broad planning, operational and accounting tasks, the creation of system-wide automated data banks and multi-machine computer complexes for collective use, tasks have been assigned with respect to levels of effectiveness and quality of the measures being planned. Thus, the program establishes tasks with respect to the increase in the mean daily utilization of medium power EVM by 10-15 percent by 1981, in comparison to the level achieved to date, while observing the norms set forth by the USSR State Planning Commission. For the republic as a whole, this indicator is to be increased by more than 12 percent by extensive utilization of the principle of collective use of computer facilities, acceleration of the development of software for the unified series [YeS] of EVM and other measures. The program also sets forth assignments related to increasing the scientific and technical level of ASU by 30-40 percent. The mean value as a whole for all systems in existence and developed in the republic is to be at least 6 points [arbitrary units] in contrast to the 4.5 achieved during the Ninth Five-Year Plan (an increase of 33 percent).

As a result of the goal-directed (primarily based on the content of the tasks performed) development of existing and the creation of new ASU based on third generation computers and standardized plans, their economic effectiveness is to increase by at least 25 percent in comparison to the values called for in the norms.

As a whole, based on the program, the time required for amortization of the cost of introduction of computer technology among the union republics

and republic ministries and departments has been set at 2.4 years, in contrast to the current norm of 3.3 years (a reduction of 37 percent).

The analysis performed by the State Planning Commission, UkrSSR of the results of performance of program tasks in 1976 and planned steps for 1977 has confirmed the possibility of performance of these steps with the required quality and effectiveness.

However, the complex process of introduction of computer technology to the national economy of the republic is not always a smooth one. The influence of ASU on the primary resultant technical and economic indicators of plants, particularly the productivity of labor, is still insufficient. There are a number of unsolved problems, of organizational, scientific, technical and juridical nature. Therefore, the workers in industry, agriculture, transportation and communications, construction, as well as scientists and designers must multiply their efforts in this sphere of activity in order to fulfill the historic plans of the 25th CPSU Congress in the best possible manner.

USSR UDC 658.012.011.56:336

EXPERIENCE IN DEVELOPMENT OF THE "NONPRODUCTIVE FINANCES" SUBSYSTEM OF THE ASFR SYSTEM USING STANDARD MODULES

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, Oct/Nov/Dec 77 pp 24-27 manuscript received after completion, 7 May 77

KNYAZEVA, S. T., engineer

[Abstract] The selection of standard technological modules for the "nonproductive finances" subsystem of the ASFR [Automated Management System for Financial Estimates] of the Ministry of Finances, UkrSSR, was based on article-by-article distribution of expenditures as to type of institution in accordance with its budget classification. An investigation of the existing method of processing of data on financing of educational, cultural, scientific and personnel training institutions shows that in the first two stages planning is based on the type of institution at the republic, oblast and ministry level. The production of final indicators requires that they be selected from each standard module for the production of end results. Four hierarchical levels are distinguished in the computational approach used, and an example of construction of a typical module is presented. The separation of typical modules in the preliminary stage of systems planning allows systems analysis to be applied to data processing in

order to construct the apparatus for further investigation of the system, utilizing a single mathematical model. A hierarchical tree diagram is presented of the process of calculation of expenditures for purchase of expendables and equipment for a typical institution. Figures 3; references: 3 Russian.

USSR

USE OF COMPUTERS IN INDUSTRY

Moscow SOVETSKAYA ROSSIYA in Russian ("The Computer Manages Industry") 22 Feb 78 p 2

DULOV, V., professor, dr in physical and mathematical sciences, director of the Krasnoyarsk Computer Center of the Siberian Branch of the USSR Academy of Sciences

[Text] Progress in the development of science and technology today cannot be imagined without extensive application of electronic computers. With the aid of computers natural resources are modeled, the mysteries of the microcosm are studied, and space ships strive ever further into the universe. But it may well be that the greatest effect has come from the use of computers in the area of industry.

When the Computer Center of the Siberian Division of the Academy of Sciences USSR, was created in Krasnoyarsk, one of the basic scientific directions was defined as the theoretical and applied development of the use of computers for organizing and managing the national economy, above all in the eastern rayons of the country. Krasnoyarskiy kray is the most rapidly developing region in eastern Siberia.

Scientific, strictly well-founded methods of management are ever more attracting the attention not only of industrial managers, but also of party, government, and public organizations. A special scientific council was created in the CPSU kray committee after the appearance of the decree of the Central Committee of the party "On the Activities of the Siberian Branch of the Academy of Sciences, USSR, in Developing Fundamental and Applied Scientific Experiments. Increasing their Effectiveness, Implementing Scientific Accomplishments in the National Economy, and Training of Personnel." It includes both a section on automated management systems (ASU) and one on computer technology. This makes it possible for scientific workers--mathematicians and specialists in computer applications--to work in direct contact with operational managers. Coordinated design is being done on a territorial ASU for the kray, a system for managing the work of all forms of transportation, and the creation on this foundation of an ASU for the Krasnoyarsk transport center, an increase in the efficiency of use

of group computer centers and new computers, as well as the creation of ASU's for large-scale industrial enterprises such as the Noril'sk mining and metallurgical combine and the Krasnoyarsk and the Sayanskiy aluminum plants, the latter of which is under construction.

For forecasting the activity of this polar metallurgical giant, Krasnoyarsk and Noril'sk specialists have created a mathematical model embracing the work of the major subdivisions, including copper smelting and nickel plants and a conglomerated factory. The solutions put forth by the computer were completely confirmed in practice. The managers of the combine have received a reliable instrument for controlling and managing the most complex technological processes. Next in line is the creation of a combined ASU including all basic enterprises.

The union of science and industry hastens not only technical, but also social progress. And above all this concerns methods of management. At the present time a change of computer generations is under way. Many authoritative experts state that the shift to a third generation of computers is potentially a more significant leap than was the shift from mechanical accounting machines to electronic computers.

In the Siberian Branch of the Academy of Sciences USSR, ASU's based on new principles are being developed: machines of the third generation contain qualitatively new capabilities. One of their advantages is a substantial increase in the ease of access to the computer system directly from the workplace. Machines can be combined into computer systems. The connection with the computer is made with the aid of inquiry stations--terminals which can be located far from the computer.

Such terminals, for example, today link the Noril'sk and Krasnoyarsk computer centers, as well as connecting the Krasnoyarsk center with Novosibirsk. This permits more efficient and effective use of electronic technology and the conducting of a "dialogue" with machines which are not in the given city. In these circumstances it is not at all obligatory for each enterprise to have its own computer technology. It is sufficient to have the required number of terminals for communication with the computer system. Simultaneous use of a computer by different subscribers has been given the name of the concept of collective-use computer centers. The creation of third generation computers has made it necessary to review certain principles in designing ASU's. The task consists of making them an organic part of an enterprise with the goal of improving management so the very best economic indicators will be attained.

In the Siberian Branch of the Academy of Sciences, USSR, the concept of ASU on several levels has been developed. The lowest level in the system is the production section. The next level is the shop, then the enterprise as a whole. Along with its traditional responsibility for data processing, the system must also assume a portion of the control and management functions of the enterprise. The precise functioning of an ASU of this type will resemble the action of an automatic pilot.

In the near future it will be possible for us to teach all management personnel to work on devices with a keyboard such as a typewriter and a cathode ray tube such as on a television. The instructions will precisely define the responsibilities of the workers. Information will begin to be exchanged basically only through the computer. This will make it possible to regulate the labor of the management apparatus and sharply reduce or even eliminate information exchange on paper.

Currently the realization of this prospect is made more difficult, in particular, by the rather high cost of terminals. Our national industry is faced with mastering the production of economical and reliable devices of this type. The stable functioning of an ASU essentially depends on the reliability of the operation of the computers and other technical equipment: unsatisfactory working of a computer only discredits the idea of automation, creating disappointment in its abilities.

This is why we believe that the ASU for newly created installations should be developed at the same time the enterprise is being built. Assimilation of the new capabilities must begin in a situation where the management system is functioning. This will make it possible to instruct the personnel and develop the control structure and official instructions in a timely manner. It is precisely in this way that the ASU is being created for the Sayanskiy aluminum plant which is under construction; the introduction of its first capabilities was set by the 25th CPSU congress for the Tenth Five-Year Plan. It appears possible to complete this job at the most current scientific and technical level in order to be able to use the system as a model for our country's non-ferrous metallurgy. For this purpose it is essential to form at once a skeleton management staff and connect it directly to the creation of the ASU.

The realm of computer utilization is constantly growing. With their help today we determine the epicenters of earthquakes and monitor the condition of the environment from airplanes and artificial satellites. Computers make it possible to calculate the size and direction of forest fires in the Siberian taiga and consequently to take the required measures to put them out. Specially developed applications packages make it possible for physicists, chemists, and machinists to automate scientific experiments. And, especially importantly, it has become possible to bring the means of communication between man and machine close to natural. Computers are learning to read blueprints, analyze photographs, and understand tape recordings.

As is well known, an "electronic brain" is distinguished by being utterly uncompromising, by the absence of the least subjectivity. Its universal use will facilitate to a large degree attaining the greatest results with the least expenditure: this task is derived from the decisions of the 25th party congress and is especially stressed by the documents of the December (1977) Plenum of the CC CPSU.

D. Extractive Industries

USSR

AUTOMATED CONTROL SYSTEM FOR PROCESSING GEOLOGICAL PROSPECTING DATA

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("The EVM "Draws" A Site") 7 Mar 78 p 2

[Text] Tallin--The Minsk-32 required only 45 minutes to hand scientists an "X-ray photograph" of the Oruskoe peat deposit, the largest in Estonia, with all the required quantitative and qualitative characteristics. Previously this would have taken the entire staff months of tedious work.

This was the first result achieved by the use of the automated system for processing of geological prospecting data created by the Institute of Geology, Academy of Sciences, Estonian SSR.

The new system decreases by 100 times the time taken in processing results of geological field studies, but most important, provides a three-dimensional model of the deposit. After the results of laboratory analysis are fed into the computer, the machine prints a cut-away view of the site. This allows errorless judgment of the position and quality of the minerals.

USSR UDC 658.012.011.56:621.771.06

AN AUTOMATED MANAGEMENT SYSTEM FOR TECHNOLOGICAL PROCESSES FOR A 1500 BLOOMING MILL

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3, Jul/Aug/Sep 77 pp 41-45 manuscript received 6 May 76

POPEL'NUKH, V. I., candidate in technical sciences

[Abstract] The Nizhne-Talil'sk Metallurgical Combine [NTMK] is in the process of constructing a complex of automated mills for rolling of broad-face I-beams. The first section of this system of mills, the 1500 blooming mill, is already in industrial operation, while the second section, a universal beam mill, is in the stage of manufacture and delivery of equipment. The ASUTP [automated management system for technological processes] with a control computer (UVM) to operate the 1500 blooming mill was developed by the Institute of Automation in Kiev in cooperation with the combine, the Ural Machinery Plant (which manufactured the rolling equipment) and other organizations. The primary tasks of the ASUTP are: to increase the quality and effectiveness of rolling of blooms; to decrease metal waste during cutting by at least 1 percent; to increase accuracy of rolling to ±1 mm; to assure the planned productivity and variety of products; to provide efficient loading of electric and mechanical equipment; and to improve the conditions and safety of labor of mill workers. The ASUTP includes 7 local automatic management systems (ASU) and ASU with UVM, an M-6000 3rd generation computer, completely automating the process of operation of the mill. A structural diagram and description of the operation of the system are presented. The expected annual savings resulting from the introduction of the combined ASUTP with the computer is 940 thousand rubles overall, 850 thousand rubles for the local process control systems, with amortization times of less than 2 years. The savings will result from a 7-9 percent reduction in variation in cycle length of rolling because of increased evenness and smoothness of operation of the system, plus increased accuracy in cutting of blanks, which decreases the quantity of waste metal. Figures 2.

USSR

UDC 681.2.002.612:658.012.011.56

AUTOMATION OF QUALITY CONTROL OF PRODUCTS IN THE INSTRUMENTS-BUILDING BRANCH OF INDUSTRY

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, 1978 pp 1-3

SINYAK, V. S., dr in technical sciences, GOLOVASHKIN, M. A. and POLOZOV, YU. YE., candidates in technical sciences

[Abstract] The first steps in creation of a combined system for product quality control (KSUKP) have been taken in the development of the second section of the automated management system (ASU) for the instrument-building branch, "ASU-Pribor II." The subsystems on planning and accounting for scientific research and design development work include tasks allowing monitoring of the creation of new equipment on the basis of orders (requests). The machine-oriented orders (requests) allow thorough planning in the area of new equipment, beginning with scientific research and continuing through to series production of the new hardware. A structural diagram is presented, outlining the interactions of the various elements in the product quality control subsystem, showing the organizational subordination and content of the various operations involved in testing and control of the quality of products, planning of scientific research and development work and cost accounting. A flow chart illustrates the information flows moving through the quality control subsystem, showing the organizations, enterprises, departments and organizations involved in information exchange and how information flows from 1 to the other, centering about the main computer center where "ASU-pribor" is run. Figures 2.

USSR

ENGINEERING ASSURANCE OF HIGH-QUALITY PRODUCTION OUTPUT

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 1, Jan 78 pp 80-83

SENYUT', T., candidate in economic sciences, Deputy Director of MKTEI-avtoproma [?Moscow Institute of Transportation Economics, Automobile Industry]

[Abstract] Use of standardized subassemblies and computer-aided assembly in the computer, machine-building, and automobile industries is resulting in higher quality and productivity.

Better quality control by means of standard subassemblies is being encouraged by the Central Committee of the KPSU. This method is being

used in the Electronic Computer Plant imeni G. K. Ordzhonikidze, in the tractor industry, and in the Minsk Automobile Factory. Examples of increased productivity are given.

Computer-aided automation of the assembly process at the Ordzhonikidze Plant has quadrupled productivity and drastically improved working conditions by removing monotony and lowering psychological stress. Examples of computer-aided production tools cited are a program-controlled riveting machine and a welding machine.

Reference is made to a Unified System of Technological Preparation of Production (ESTPP), which contains 3,200 standards. It is expected to increase small-batch productivity by 30-35 percent and large-scale production productivity by 10-15 percent while significantly improving quality.

Also mentioned is a Unified System of Design Documentation (ESKD) that also encourages standardization of subassemblies. Such standardization has cut production time of certain special machine tools from 4-6 months to one, and of some semi-automatic machine tools from one to two months to 10-15 days.

USSR UDC 658.386.06

SCHOOLS OF ADVANCED EXPERIENCE--AN IMPORTANT RESERVE FOR IMPROVING PRODUCTION EFFICIENCY

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 2, 1978 pp 56-57

ROMANOVA, A. T., engineer, Center of NOT [?Scientific Organization of Labor Center], Administration of Instrument Making

[Text] One of the most effective forms of spreading the extent of the advanced production workers, as is known, is the advanced experience schools which in recent times have been developed also in instrument making. These schools combine the possibility of operative transfer of the experience of the advanced worker to the broad masses of workers with simultaneous teaching of them in the methods of scientific management, clear understanding of the specific economic management of production. In other words, the primary goal of the advanced experience schools is to assist all of the workers in the mastery of the advanced methods of labor so as sharply to increase the productivity of labor while ensuring production quality in accordance with the goals advanced by the Tenth Five-Year Plan.

The analysis of the work of the best schools of advanced experience in the industry demonstrated that after training in such schools the productivity of labor of the workers increases on the average by 4 to 8 percent. Thus,

at the Instrument Making Plant "Manometr" Moscow and at the Kishinev NPO [Scientific-Industrial Association] "Mikroprovad," the growth of the productivity of labor of the students at the advanced experience schools was 4.1 to 5.8 percent.

In these and many other enterprises, the improvement of the productivity of labor has promoted teaching the students specific and the most complicated production operations. For example, at the school run by Superintendent N. V. Kozakova of the Klinskiy Thermometer Plant for teaching one of the most complex operations "heating of glass to the melting stage," 20 out of 30 hours of the total budgeted time allotted for the exercises were expended, diverted to the study. After training, six out of the nine students at the school increased their productivity of labor by 5.8 percent.

A significant amount of work has been with the school students with respect to improving the quality of the production output and reduction of losses from waste. At the First Moscow Clock and Watch Plant imeni S. M. Kirov, the waste among the graduates of the advanced experience school was reduced on the average by 80 percent, and in the school directed by V. V. Yermakov, for 5 female workers being trained in advanced methods of labor for the stamping operation, the rejects were decreased up to 95 percent.

At the Klinskiy Thermometer Plant during the first half of 1976, the students of the advanced experience schools participated in the taking of 95 measures aimed at improving the production quality. This has made it possible to bring the number of products against which claims are filed down to 0.0012 percent of the volume of products sold and to reduce the losses from breakage of the glass by 264 thousand rubles.

The training at the advanced experience schools gives not only economic but also a social effect which is expressed, in particular, in the advanced training of the workers and their rationalization activity. At the "Aktyubrentgen" Plant, the Kishinev "Vibropribor" Plant, the Vil'nyus Calculator Plant imeni V. I. Lenin (PO [All-Union Association] "Sigma"), the Klinskiy Thermometer Plant, the L'vov PO "Mikropribor," the Kishinev "Elektrotochpribor" Plant (the NPO "Volna") and the Moscow Instrument Making Plant "Manometer", the students of the advanced experience schools and the schools of communist labor introduced 4,280 rationalizational proposals during the period from 1971 to 1975, and their cost benefit was 3,595,800 rubles. The efficiency proposals of the audience of V. N. Tyumin, troubleshooter at the electrical shop of the Vil'nyus Calculator Plant imeni V. I. Lenin, gave the plant an annual cost benefit on the order of 35 thousand rubles.

The efficiency of the training at the advanced experience schools depends to a high degree on the qualitative composition of the school directors. Therefore at the enterprises and in the industry associations, the selection of the directors of the advanced experience schools is given special attention. Innovators and advanced workers of production with the highest qualifications, as a rule, having middle and higher technical education are

designated as school directors. In addition, the ITR [engineering and technical personnel] of the enterprises constantly assist the school directors in creative cooperation. The consultants among the ITR helped the school students to analyze the most complex theoretical and practical problems.

The plans and programs play a highly important role in the activity of the schools. In the 1976 to 1977 academic year, in the plans and programs of the schools of many of the enterprises 75 to 80 percent of the time was allotted to studying advanced experience directly in the work areas. As a result, the students at the school at which the advanced procedures and working techniques of milling machine operator, sixth degree, A. A. Bachkov (vil'nyus Calculator Plant imeni V. I. Lenin) were studied improved the productivity of labor by 8 percent during the training period.

The effectiveness of training in the advanced experience schools significantly increased where the visual methods, slides, films, scientific and technical films and films on the operation of the efficiency experts, the working procedures of which were studied, were used in the exercises. These films are widely used in the advanced experience schools at the Kishinev "Vibropribor" Plant, the Vil'nyus Calculator Plant imeni V. I. Lenin, and the First Moscow Clock Plant imeni S. M. Kirov.

What has been discussed indicates that the operation of the advanced experience schools has a significant economic and social effect which could be higher if, for example, the number of students at the schools were increased.

As the examination demonstrated, in 1976 the number of workers trained at the advanced experience schools at a number of the inspected enterprises (at the "Vibropribor" Plant and in the NPO "Mikroprovod," Kishinev) amounted to 1.5 to 2 percent of the total number of workers at the same time as the percentage of those not fulfilling the technically based norms of these enterprises was significantly higher. At such enterprises as the "L'vovpribor" Plant and the Petrodvortsovyy Clock Plant, in the first half of 1977 the advanced experience schools in general were not organized. In addition, it is necessary to add that the training in the advanced experience schools presupposes not only encompassing of the workers not fulfilling the output norms but also the workers desiring to achieve the level of productivity of labor of the advanced workers.

It appears expedient in the future to include the organization of advanced experience schools in the plans for the organization and technical measures and the complex plan for the spread and introduction of the advanced experience of the enterprises and associations.

The selection of the students for the advanced experience, of course, must be individual. When evaluating a worker for one school or another it is necessary first to analyze his productive activity in the last 3 to 6 months in order to help him improve his qualifications and improve the production indexes. The schools basically must be set up with respect to uniform specialties (lathe operators, fitters, milling machine operators, and so on).

The training at the advanced experience schools must be done in accordance with the general plan (standard) program and the individual program for each school. The general plan (standard) programs are developed by the division of technical training primarily for the workers of the mass professions and they consist of two parts: the theoretical part which includes the problems, the study of which will permit expansion of the field of view of the students, it will give them the elements of engineering knowledge and practice where it is indicated what practical skills must be learned by the students and what procedures must be demonstrated.

On the basis of the investigated enterprises of the branch the most successful appear to be the structure of the programs and thematics of the plans compiled in the academic year of 1975 to 1976 at the Vil'nyus Calculator Plant imeni V. I. Lenin. The training plans and programs for the schools for lathe operators and milling machine operators are compiled by the directors of the schools jointly with the technical training section, they are agreed on with head of the mechanical shop, and they are approved by the deputy director of the enterprise. The structures for constructing the program and the schematic plans of these schools are identical. The program of exercises is broken down into the following topics: 1) The basic problems with respect to studying advanced procedures and working techniques; 2) The development of the technical thinking of the worker when solving process problems; 3) The measures promoting a reduction in the expenditures of time on performing machine tool operations; 4) The practical demonstration of the advanced procedures and labor techniques, 5) The practical demonstration of the procedures and methods of labor adopted by the trainees; 6) Independent work of the trainees under the observation of the school director; and 7) Summing up the results.

The content of the topics following from the peculiarities and complexities of each specialty and, consequently, the training periods is different in the plans and the programs. Thus, whereas 40 hours are allotted for training in advanced procedures and labor techniques for the lathe operators, 98 hours are allotted for training milling machine operators.

In the training plans and programs of the schools special attention is given to the practical demonstration by the school directors of the procedures and the training techniques in the work areas of the students and also their independent work. For these purposes, the lathe operators and milling machine operators are allotted 32 out of the 40 and 86 out of the 98 hours of total budgeted time.

On the basis of the standard program and considering the specific nature of the work of the given production section each advanced experience school director together with the consultant compiles an individual program which also must be agreed on by the technical training division. The technical and economic justifications are presented in the program for the advanced procedures and training techniques, and the most efficient of them are demonstrated. Individual features of them are explained.

The organization of competition for the best advanced training school and the best director of such a school can be highly useful in improving the operating efficiency of the schools. In the rules for competition for the rank of best advanced experience school and best director of a school of advanced experience, such indexes as the cost benefit from introducing the advanced working techniques by the school students; the productivity of labor of the students in the given schools; the results with respect to the production quality (the reduction or elimination of waste, the acceptance of production on the first submission with the plant symbol of quality, and so on), the economy of materials, rationalization, improvement of qualifications and the mastery of adjacent professions by the workers, and so on must find reflection.

In the rules it is necessary to consider the moral and material incentives for the best directors and students at the schools of advanced experience.

USSR

ASU DEVELOPMENT FOR UZBEKISTAN LIGHT INDUSTRY

Tashkent PRAVDA VOSTOKA in Russian ["A Degree of Influence"] 21 Mar 78 p 2

CHERKASSKIY, YE., manager of Sector of Computing Center, Ministry of Light Industry, UzbekSSR

[Text] A few years ago the Uzbekistan Ministry of Light Industry started to develop an automatic management system [ASU]. The ASU department of the ministry's Central Planning, Design and Technology Bureau assisted by the Cybernetics Institute Academy of Sciences, Uzbekistan and the Tashkent Planning and Design Bureau for Automatic Management Systems began work on the first phase. Included in it were subsystems for operational control, materials and equipment supply, technical and economic planning, accounting and economic activity, labor and wage analysis.

But first of all it was necessary to set up an information dispatching service composed of multiple-user information dispatching points for the management systems.

Group of Points--This is a small structural subdivision in which 3-5 men work. It is equipped with keyboard computers for operational processing of the information coming in from enterprises in the region served by it and with teletypes for transmitting it to the republic's sectional computer center. This kind of station has been set up in Samerkand, Fergan, Andizhan,

Namangan, Kokand, Margilan, Bukhar, Urgench and in Tashkent. Each one serves a group of light industry enterprises.

The information collected in this way is treated in the sectional computer center of which the republic's information-dispatching point is also a part. The service was put into operation at the beginning of the Tenth Five-Year Plan. It was based on an "Operational Management" subsystem which made it possible to supply the ministry and its central board with a weekly and monthly synoptic analysis of manufacturing process data.

The "Accounting and Economic Activity Analysis" subsystem was worked out in an interesting way. We were the first in the republic to solve successfully such problems as the analysis and correlation of an enterprise's balance, the composite balance of the ministry and other problems. At the same time, the first industrial automated system for scientific and technical information in the republic, the "Kristall-Legprom", was running at our plant. It permits significantly increased efficiency in providing software to managers and specialists at all levels of control of knowledge about the newest achievements in domestic and foreign science. Adopting the first phase of this system made possible the production of 234 thousand rubles worth of annual economic effect.

At the time when the sectional ASU was being developed, its linkup with a higher-level ASU was foreseen. For this reason, we are relaying information on the seventeen problems to the main computing center of the Ministry of Light Industry, USSR.

At this time our bureau is developing jointly with the Cybernetics Institute, Uzbekistan Academy of Sciences, a flowchart for functional communications on problems being solved at the level of the republic's ASU. At the same time automatic systems for managing industrial and manufacturing processes are being developed for the Tashkent and Fergan textile combines, the Namangan fabrics combine and the Tashkent footwear association. A first phase ASUP [automated production management system] has already been installed at the Malika tricot knitting association using a YeS-1020 EVM as base. The computer center is proving to be a methodical and practical aid to branch computing centers.

Our center has also been engaged in the solution of problems of an industrial nature. For the first time in light industry such a difficult problem as the sizing of sewing goods was successfully solved. Here, heuristic programming methods played an important role. The Tashkent professional sewing association put the new sizing method to use in the production of men's clothing.

Our center solved a problem related to beginning to produce new models with a minimum readjustment of equipment for the Leningrad sewing association. It was also introduced into the Tashkent sewing association "Krasnaya Zarya".

The solution of the problem of making it possible to obtain the best division of labor flowcharts for a sewing production line using electronic computers [EVM] is of considerable interest. The Tashkent professional sewing association is already applying it to an experimental procedure.

Using EVM's makes possible a qualitative difference in the process of preparing for manufacturing, improves the technical and economic indicators and raises the product quality.

Our collective is participating actively in the republic's public inspection of the computer centers' operation. Section No 7 headed by S. Tsyupko and specialists A. Malikova, Z. Farzalina, V. Sharapova, and Z. Zargarova is getting the best results. Our center is attempting to use all the forms and methods that could help raise the quality of control by the sector.

USSR UDC 658.5.011.56:061.25

EFFECT OF THE ACTIVITY OF DISPATCH SERVICE PERSONNEL ON THE RELIABILITY INDICES OF A CONTROL SYSTEM

Tashkent IZVESTIYA AKADEMII NAUK UZBEKSKOY SSR, SERIYA TEKHNICHESKIKH NAUK in Russian No 1, Jan 78 pp 15-21 manuscript received 15 Apr 77

DATSKEVICH, YU. G., Central Asian Division of the Bel'tsy State Pedagogical Institute, and MEL'TSER, M. M., Scientific-Research Institute of NII "Energoset'proyekt" [All-Union State Planning Surveying and Scientific Research Institute of Power Systems and Electric Power Networks]

[Abstract] The activity of dispatch service personnel in an integrated dispatching control system can be described mathematically, in terms of a probability distribution, as a component of the entire control system. Here the statistical characteristics of this activity are used for determining the reliability index of a dispatching control system. As the reliability index has been chosen the probability of normal operation, i.e., without shutdown during a fault or with recovery in case of a shutdown--throughout a full given period of time. The interventions of a dispatcher during a typical 24-hr period is considered, with data available on departures of the actual load curve from the predicted one, on the distribution of switchover as well as equipment connecting and disconnecting events, and on deviations of the frequency in the integrated power system from the standard frequency. The statistics of dispatch personnel interventions are calculated on the basis of a normalized and optimized Weibull distribution function. The results can serve as a basis for establishing the reliability criteria for a control system which includes intervention of dispatch service personnel. References 5: 4 Russian; 1 Western.

USSR

AUTOMATED MANAGEMENT SYSTEM OPENS AT REGIONAL ELECTRIC POWER STATION

Kiev PRAVDA UKRAINY in Russian ("ASU Controls 800,000")26 Jan 78 p 1

[Abstract] An M-6000 computer and an ASVT-D data processing complex are part of an automated management system [ASU] that has been put into operation at the 800 thousand kilowatt capacity Unit No 5 of the country's largest power plant, the Uglegorsk GRES [State Regional Electric Power Station.] It is estimated that the system will save more than 100 thousand rubles yearly. It was developed by specialists of the Khar'kov Department of "Teploelektroproyekt" [All-Union State Institute for the Planning of Electrical Equipment for Heat Engineering Structures] and was assembled and debugged by workers of the enterprise "Dontekhenergo" [expansion unknown] and GRES. The ASU in Unit No 6 of the power plant is currently being debugged.

G. Transportation System

USSR UDC 681.3.06:656.7

FORMALIZATION OF MESSAGES ON THE PLANNING OF CIVIL AVIATION FLIGHTS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, Oct/Nov/Dec 77 pp 6-8 manuscript received after completion 7 Jan 77

PICHKO, S. P., KUTSEVALOV, B. M. and BARANOV, L. A., engineers

[Abstract] A flight plan contains information on the purpose of the flight, the path to be followed (including times of departure and arrival), subordination and type of aircraft, aircraft number, etc. A definite message sequence has been selected and coding rules proposed for formalization of Civil Aviation flight plan messages. The message consists of numerical data and English (international flights) or national (internal flights) word forms, consisting of two types: control words and data base elements. The control words indicate the type of message, purpose of the flight and other characteristics which determine the method of processing of the message; the data base elements consist of generally accepted terms. A flow chart is presented for the algorithm used for formal checking and editing of message texts. The method of formalization is used in planning the system of preliminary flight planning at the information-computer center of the Ukrainian Civil Aviation Administration. Figures 1.

USSR

UKRAINE MOTOR TRANSPORT INDUSTRY INTRODUCES AUTOMATED MANAGEMENT SYSTEM

Kiev PRAVDA UKRAINY in Russian ("With the Help of Electronic Computers") 25 Jan 78 p 2

MOTIN, I., deputy minister for Motor Transport, Ukrainian SSR

[Excerpt] Comprehensive work on perfecting the structure and methods of control at various levels is in progress at the Ministry of Motor Transportation, Ukrainian SSR. The introduction of automated management systems (ASU) is promoting the revelation, as well as the most rational use, of the industry's materials, manpower and financial resources. This is being conducted within the scope of a single specific program for automating the industry, and it will allow us to establish prerequisites for the future construction of a unified, automated system for assembly, storage, data processing and industry management.

A series of undertakings for the optimum planning of the transport of goods, petroleum products and small batches of freight in the commercial network of the republic's cities and the estimating of the requirements in petroleum

products, tires, etc. are determining the initial ASU operating priorities for the management of the trucking industry in Kiev, Donetsk, Odessa and Vinnitskiy.

According to charts calculated by an electronic computer (EVM), more than 60,000 vehicles belonging to various ministries and departments in the republic are annually involved in the transport of agricultural products. Through their rational use an annual savings of over one million rubles has been achieved. Thus, the productivity of vehicle operations by the Donetsk trucking administration in the transport of freight, planned with the assistance of economic-mathematical methods and EVM has grown by 23 percent, and the volume of the inter-city transport of freight handled by the ministry, by 1.6 times. Computer processing of research data on passenger flow in the cities makes possible optimization in the arrangement of bus routes and as a result is increasing the efficient use of passenger transportation. The anticipated annual economic impact from the introduction of optimal motor bus flow scheduling in Kiev will exceed 200 thousand rubles.

With EVM assistance the problem of specialization in vehicle repair enterprises was solved and estimates were worked out for the formulation of their long-term development plans. At the present time, the concentration and super specialization of the vehicle repair plants have been successfully accomplished. The specialization level in the vehicle repair industry has reached 76.9 percent.

Within the framework of that same specific program during 1977, the initial phase of an industrial automated management system (OASU) for the Ministry of Motor Transport, Ukrainian SSR, was turned over to industrial use. It resolves 60 complex problems, in technical economic planning, accounting and analysis of economic operations, estimates of requirements and the optimal distribution of material resources and operational control. In this initial phase, OASU also functions as an information-reference subsystem which displays on the output screens of the ministry, Kiyevgruzoavtotransa [Kiev Trucking] and Kiyevpasavtotransa [Kiev Passenger Transportation] more than 260 different pieces of reference data concerning the status of operations in the motor transport and repair enterprises in Kiev. This makes it possible operationally to control facilities and at the same time exert an influence on the progress of planned mission performance.

The solution of technical-economic planning problems with EVM assistance has permitted the industry to raise the quality and soundness of its plans, to keep track of a variety of factors which have an impact on the various indicators of motor transport operations, and to use resources more rationally. The calculations which were produced based on the transportation resource requirements for hauling beets in 1977 permitted the freeing of nearly 30,000 vehicles during the harvest. Investigation of the requirement for vehicle and assembly overhaul and of its optimum distribution amongst the republic's vehicle repair plants has effected a monetary savings of 100 thousand rubles. The introduction of the initial phase of

OASU has also brought 2.2 million rubles into the economy. Therefore, the expenditures will be amortized in only a little more than a year.

Experience with the introduction of ASU shows that maximum results in the determination of goals are achieved when made at the industry level. This exceeds by many times the effects of establishing goals at the management or association levels.

At the present time, development of the industry's second ASU phase is underway, as well as ASU for the regional and municipal administrations for freight and passenger motor transport, ASU for technological processes and a motor bus route scheduling system in Kiev, Donetsk, L'vov and Simferopol'. By the end of the Tenth Five-Year Plan, 22 initial phase automated control systems will have been introduced into the industry.

The functional capabilities made possible through ASU, including second generation OASU, are used primarily for supporting technical economic planning and operational control over transportation, and the organization of material and technical supply.

One of the main objectives of ASU operation is the essential raising of the relative significance of the optimized goals.

The implementation of these tasks requires great efforts in the organization of planning and promoting ASU in the industry, including the preparation of production for operating in an ASU environment. The ministry has specified operational managers for each system, created a coordination council, and designated scientific managers and a lead operations organization. Of great significance is the agreement with the Institute of Cybernetics of the Academy of Sciences, Ukrainian SSR, which assumed the scientific leadership in creating automated management systems for general use motor transport in the Ukraine.

Production of the planned ASU in the Minavtotrans [Ministry of Motor Transport] Ukrainian SSR, during the 1976-1981 period, with the aid of economic-mathematical methods and EVM, will facilitate the handling of more than 50 percent of the freight and passenger transport volume, optimize the basic technical-economic operational indicators for general use motor transport and guarantee the future increase of both efficiency and quality of industry management by the end of the Tenth Five-Year Plan.

USSR

THE COMPUTER ADVISOR

Moscow PRAVDA in Russian 11 Feb 78 p 2

KOKUSHKIN, A., head, Volga Territorial Transportation Administration, Saratov

[Abstract] The container area of Saratov-2 Railroad Station is equipped with television and the latest communication equipment. The personnel of the area maintain contact with the railroad, their clients and container truck drivers by radio. The station processes over 300 containers per day, utilizing electronic computer processing of documents. The computers used by the Volga Territorial Transport Administration supervise the transportation of 4.6 million tons of cargo per year, and yield a savings of 400 thousand rubles per year by improving the efficiency of truck routing and providing the information which managers require to make intelligent decisions. The author suggests that computerized scheduling systems suitable for the organization of truck transport be manufactured, enclosed in trailers, and delivered complete to trucking organizations.

USSR

WOMEN WORK IN RIVER TRANSPORT SYSTEM

Moscow RECHNOY TRANSPORT in Russian No 2, 1978 (inside front cover)

[Excerpts] Many women work in the field of river transportation. They take an active part in socialist competition for early completion of production goals for the Tenth Five-Year-Plan. They are greeting 8 March, International Women's Day, with great achievements in labor--their right to work is guaranteed them by the Constitution of the USSR.

Engineer Vera Nikolyevna Kornilova has worked for many years at the computer center at the Volga United River Steamship Line. She is a fine specialist and has trained many operators. She was rewarded for her excellent work with the medal "Victor of Socialist Competition for 1977."

The photograph shows V. Kornilova (on the right) and operator Ye. Gribanova.

USSR

UDC 658.012.011.56:664

LOGICAL TASKS IN THE "OPERATIONAL MANAGEMENT" SUBSYSTEM OF THE UKRAINIAN FOOD INDUSTRY SECTIONAL AUTOMATED MANAGEMENT SYSTEM

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, Oct/Nov/Dec 77 pp 21-23 manuscript received 17 Dec 76

LOSEV, V. G.

[Abstract] The operational management system of the Ukrainian Food Industry Sectional Automated Management System [OACU-Ukrpisheheprom] processes operational information concerning the fulfillment of planned tasks by production associations, combines and self-contained enterprises. This requires processing of large quantities of information in short periods of time. Input and output information types and formats are noted. Considerable time is saved by performing cost-effect analysis and printout only for enterprises for which problems have been detected. On the basis of concrete examples, the high efficiency is shown of the use of logical problems which assure precision of output information.

USSR

CREATION AND BENEFITS OF NEW AUTOMATED MANAGEMENT SYSTEM DETAILED

Kiev RABOCHAYA GAZETA in Russian ("A Dialog with 'Hermes'") 14 Feb 78 p 2

MOROZ, V., manager, SKB (special design office), Division of Mathematical Machines and Systems, Institute of Cybernetics, Academy of Sciences, Ukrainian SSR

[Text] This was a wonderful gift from the Ukrainian cyberneticists to the personnel at the Central Department Store of the Ukrainian capital. On the eve of the present year, the Interdepartmental Commission put into operation phase one of the automated management system, "Hermes-1". The whole thing started in the autumn of 1974, when representatives of the Ministry of Trade of the UkrSSR and of the Institute of Cybernetics at the Ukrainian Academy of Sciences signed an agreement, whereby cybernetics was applied to the control of trade for the first time in the republic.

The starting points for the creation of the "Hermes-1" automated management system (ASU) were the machines included in the Unified System of Computers (EVM), and the 4th-generation "Pal'ma" integrated system for processing data bases, which was developed by Professor Bakaev's division. What, then, does it include?

In managing commercial operations, the number of indices a machine must work with can be numbered in the tens and hundreds of thousands. But if, for example, we were to take into account all the price-setting features of even one type of product (let us say, men's winter coats), then the number of different combinations with which the machine would have to work would exceed 10^{12}. The number is indeed astronomical.

But inputting and outputting information quickly is not the only matter of importance. It is also necessary to know where it has been loaded and to find the needed recording on a disk or tape with lightning speed, in thousandths of a second. To speed up the retrieval of needed information, compress it in such a way that it fits on a limited field of carriers, and make handling the information convenient for both the operators and the machine--all of this the Pal'ma system for processing data bases helps to accomplish. If it were not, perhaps, for this system, it is doubtful we could handle the problems posed.

The main feature of the Pal'ma is its plan of construction, which, in its closest approximation, copies the design of the human memory. It is easy to handle, cuts the work of the operator in half, and is multifunctional and appropriate for solving many problems. It is easy to adapt the Pal'ma, not only for a given department store, but also for any commercial enterprise with a large assortment of goods.

It was precisely this system that permitted the contruction of not simply an ASU, but a second-generation ASU. Whereas in standard control systems there existed a data base for each individual problem, the base here is integrated. In other words, it is common, not only for all the problems being solved, but also for those that remain in the future.

The department store management has now already obtained about 40 different documents from "Hermes." Summaries, reports, and other needed papers, printed in characteristic computer "handwriting," come to the manager daily by 9:00 A.M. And in the near future, it will be possible to examine any such report within minutes on a display screen, a device that connects man and computer and which is similar to a large television equipped with a special typewriter keyboard.

The system was not given the name of the ancient Roman god Hermes, patron of trade, unintentionally. It is to become a reliable aid to department store personnel in estimating, on time, the availability of goods and the changes in consumer demand, in producing all calculations for purchases made on credit, and many other responsibilities. According to preliminary estimates, the economic effect from the introduction of the first phase of ASU for only one object was greater than 200 thousand rubles, while the overall cost of developing the project of the first-phase ASU over 3 years came to 225 thousand rubles in all.

From where, then, does such high economic efficiency come? A precise calculation of the goods in stock permits lowering of above-norm reserves and of bank credit and avoiding unmarketable products in time. In fact, according to the latest statistics only, in our republic not less than a billion rubles in stale goods was accumulated. In the department store, for example, there are 36 warehouses. Each of them stores about 2 thousand different items of goods.

It has been estimated that the time saved in taking inventory of each warehouse will yield an economic effect of not less than 500 thousand rubles per year.

And here is an example related directly to the mercantile process. Approximately 45 minutes is spent repairing one cash register in a store department when it breaks down. Lines grow at other cashiers, valuable work time is lost, and so are potential buyers. If, however, the optimal substitution variant for the broken equipment were to be selected using a computer, this would save in every case not less than a thousand rubles, and hence there would be more sales exactly at that sum.

And such examples could literally be presented for every solvable problem. In a credit department where 70 staff members serve more than 100 thousand people, labor productivity will increase by 60-80 percent. Besides this, it will be possible to avoid the so-called "hopeless liabilities." The solution of problems in the control of commodity turnover will help in maneuvering goods and simultaneously responding to fluctuations in demand, etc. In brief, you cannot enumerate everything. The main thing is that the possibilities for consumers are widening significantly. In fact, it is no wonder that the scientific director of the plan, Professor A. Stogniy, corresponding member of the Ukrainian Academy of Sciences, even today speaks of the inclusion of the consumer into the ASU of a department store as a real task.

Here we would like to pause to consider one condition that is very important for the creation of the ASU, the so-called "principle of the first manager." For successful operation, the personal interest and constant participation of the manager of the enterprise at which the ASU is being developed is needed. It is he, precisely, who must serve as an example for his subordinates, to show them how, and sometimes force them, to work with the ASU as it requires. In fact, there is not one automated system that will tolerate irresponsibility or confusion, to say nothing of "sticky" data.

And we should note that the department store manager worked just as hard with us on the ASU's "coming to life" and its link-up with people. In fact, in the creation of the system only 5 percent of the labor has been spent on the development of the "iron" itself, that is, on the programs and equipment. Ninety-five percent was spent in the whole collective "getting used to" the work. And this has been extremely difficult.

Included in the second phase of the "Hermes-1" ASU is a series of complexes of problems in bookkeeping, commodity turnover planning, and supply. The amounts and possibilities of the technology, capacity, and speed in the information input and output apparatus are increasing significantly.

Such an accumulation of capacities will help to make possible a qualitative jump and transition to the creation of a third-generation system. It is perhaps this exactly that can be called a true ASU. In place of individual problems, a logical-mathematical model of processing commercial and economic indices will appear. This means that it will be enough for the manager to select on the display keyboard any question that interests him--naturally, in a language understandable both to man and machine--and after several minutes the ASU will give him an answer either on the screen or in the form of a printed report.

And the day is not far away when the consumer, entering the Central Department Store, will be able to turn for advice or express his own requests, charge a purchase or discuss what to select, not with a salesperson but with...a screen, on which the words will light up: "'Hermes-1' is speaking with you."

I. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

MODEL OF SAMARKAND WATER SUPPLY FACILITY AIDS IN PREDICTIONS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("At The Control Panel Of An Electronic Computer") 17 Jan 78 p 4

[Text] Tashkent--Scientists at the Institute of Cybernetics, Academy of Sciences, Uzbekistan SSR, have developed a mathematical model of the water supply of Samarkand. They have developed special programs which allow electronic computer calculations on optimal regimes of water distribution according to yearly seasons and determination of prospects for the development of pipelines. The model created became fundamental to the project of reconstruction of the water supply system of one of the most ancient cities of Central Asia.

The Samarkand model will be used as a standard in the reconstruction of water storage systems for Fergana, Andizhan, and the young industrial city of Angren.

USSR

WHAT THE COMPUTER WAS TALKING ABOUT

Frunze SOVETSKAYA KIRGIZIYA in Russian 18 Jan 78 p 3

ANDRIASH, V., head, Group for Mathematical-Economic Modeling, Institute of Physics and Mathematics, Academy of Sciences, Kirgiz SSR

[Abstract] The Institute of Physics and Mathematics, Academy of Sciences, Kirgiz SSR has been involved for some time in the development of means to improve the scheduling of the assignment of agricultural workers to the sugar beet industry. Computerized analysis shows that the present practice of shifting as many workers as possible into the fields during harvest time is frequently ineffective: too few or too many workers may be sent to individual farms, and workers shifted from industrial production may result in a greater loss to the economy because of days missed at their regular job than they can possibly gain by increasing the harvest. A computer-generated, realistic schedule for the actual number of persons required for harvesting, transportation and storage of the sugar beets would allow more intelligent allocation of labor resources and save money.

USSR

AUTOMATION IN LIVESTOCK BREEDING

Minsk SEL'SKAYA GAZETA in Russian ("Automation on the Farm") 9 Feb 78 p 2

CHERNYSHEV, V., dr in technical sciences, and LIVSHITS, L., candidate in technical sciences

[Excerpts] The creation in the republic of large livestock breeding complexes which produce their output on an industrial basis has moved to the forefront of the plan, the improvement of technological processes by means of implementing efficient automated management systems [ASU].

A livestock breeding complex is a complicated, dynamic production unit with a large number of connections. In a fundamental way, this distinguishes the system from those used in industry. For each animal a feed ration is carefully prepared, data about it is entered into a control device, and the basic characteristics of the given ration appear on a light indicator board: its composition, level of energy, protein and trace element contents, potential weight gain or milk yield for a day, and possible corrections to the ration. There is automatic checking on the quantity of feed mixture consumed by each animal, daily individual weight gain or milk yield, and such physiological characteristics as the animal's body temperature, breathing rate, and activity.

Automatic devices are controlled by the animal's movements: thanks to miniature high-frequency pulse generators fastened to the animal's neck, it is possible in any part of the complex and with any number of animals accurately to determine their individual indexes, without which it is impossible to create really effective control.

A central subsystem of organizational structure and complex management is created on the basis of contemporary models of electronic control computers of the ASVT-M-6000, SM-1, Elektronika-100 I, and Elektronika K-200 type. The control machine is connected to a large number of sensors for information collection and to control and monitoring devices. This makes it possible quantitatively and qualitatively to reorganize such basic technological processes as feed preparation, feed distribution, the microclimate, and manure removal, to perform technical and economic analysis, to forecast and do optimal planning, and to have data on the animals' veterinary and stock-breeding characteristics and on material and technical supply.

The first steps have already been taken toward introducing ASU in the republic's livestock breeding complexes. Thus, for example, at a republic seminar in Mogilevskiy oblast there was a demonstration of an automated production monitoring and management system for an industrial type livestock breeding complex in the "Voskhod" sovkhoz-combine which finishes 24,000 pigs a year.

The automated system which has been installed permits operational remote management of the course of basic technological processes and continuous lines and provides for automatic checking of the condition of equipment and visual monitoring of the condition of the animals in the production buildings of the pig-breeding complex. The implementation work was done under the direction of the Central Scientific Research Institute for Mechanization and Electrification of Agriculture in the Non-Black Soil Region of the USSR. The economic savings from the implementation of this system in the "Voskhod" sovkhoz-combine is expected to be 50,000 rubles a year.

The construction of an ASU in a livestock breeding complex is a complex job which requires large capital investments. Mistakes are possible in this work, which can reduce the expected savings to nothing. One of the most wide-spread mistakes in installing ASU is that, until profound research on the modeling and optimizing of automated technological processes is carried out, one observes a tendency to leave out logically obligatory stages of implementing a system and to reduce all the problems of creating a system to the installation of a computer. As Academician V. M. Glushkov notes, "the simple transfer to a computer of those functions currently being performed by the management organs usually does not lead to success and, as a rule, discredits the idea of automation."

The creation of an ASU in a livestock breeding complex will make it possible to link production in a unified system for automated management of agriculture in the Belorussian SSR. Despite definite difficulties it is essential to direct efforts more broadly in this direction and to coordinate the efforts of various organizations under the control of a leading center.

USSR

AUTOMATED AGRICULTURAL MANAGEMENT SYSTEMS PLANNED FOR A KAZAKH SSR

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian ("The Computer Comes to the Aid--Agriculture on a Scientific Basis") Mar 78 p 2

SALOPYKOV, E. and ASANOV, M., associate professors, Department of Economic Cybernetics, Kazakh Agricultural Institute

[Excerpts] The Head Computer Center of the Ministry of Agriculture, Kazakh SSR has been placed in charge of developing a unified management system in the republic. However, in our opinion, it is also necessary to create a coordination center subject to the authority of this same ministry.

The novelty and complexity involved in working out a system such as a sector-wide automated agriculture management system require that the head organization carries out in full a methodical supervision of developments,

because the manner of solving individual problems of project planning here may frequently depend on the understanding of, and the relationship to them of isolated executives and representatives of planning departments. The supervisory center must likewise place under its control matters involving the maintenance of a unified information and engineering base. A portion of the operations will be carried out by coexecutives of other scientific institutions. Their financing must be centralized.

The introduction of a sectorial automated management system will require the implementation of large-scale organizational measures: changing original forms of documents, structures of management departments, operational duties of management staff, forms of control and accountability.

Know-how gained from working out sectorial automated management systems in industry indicates that it appears to be impossible to work up an entire system as a whole, down to the smallest details. In general terms, its development consists of a phase-by-phase introduction and gradual accumulation of individual subsystems while keeping a continuity of management methods.

The most important of the component parts of the sectorial automated management system is the subsystem for prediction and optimum production planning. It is responsible for answering questions regarding what, where, when, and in what quantity to carry out production. Long-range forecasting should provide for the working out of an entire complex of events in the agricultural development of the republic or of a large region. Measures for the best utilization of agricultural resources, for determining ways of keeping livestock, level of productivity, rates of herd reproduction, improvement of breeding stock and other things come into consideration here. All of these questions will be answered with the aid of mathematical simulation and electronic computers. The results of finished operations will be reflected in specific economic indicators, in numerical form, suitable for computer input.

The possibility of fulfilling these tasks will depend largely on the successful work of sectorial scientific-research institutions of the republic, experimental stations and relevant departments of agricultural VUZ's.

The Ministry of Agriculture, Kazakh SSR, has been provided with additional allocations for conducting scientific-research operations in connection with the creation of sectorial automated agriculture management systems. Thus, on the basis of direct economic agreements of the republic's head computer center with the department of economic cybernetics of the Kazakh Institute of Agriculture, work is being carried out for the purpose of creating an "Operations Management" subsystem on an oblast scale. The Alma-Ata Zoological and Veterinary Institute is predicting livestock productivity by breed and sex-age groups.

Active enlistment of scientific VUZ's in the work of developing subsystems of the sectorial automated agriculture management system will aid in the

formation of techniques and help prepare standardized reference material for working out national economic plans. In addition, mathematical analogs will be formulated and algorithms developed for long-range planning calculations.

The problem of training the proper personnel is becoming acute in connection with the utilization of new methods of scientific research, with the introduction of electronic computers, and with the increase in number of oblast computer centers. In the agricultural VUZ's of Kazakhstan there is an immediate need to arrange for the training of economics-cybernetics specialists, programmers and operators for mechanized processing of economic information and systems engineering.

Collectives of enterprises and scientific research institutions, along with highly-specialized workers, should actively participate in the process of creating sectorial automated agriculture management systems. To this end, it is advisable to set up continually-offered courses for upgrading personnel skills at republic agricultural VUZ's.

USSR

COMPUTATIONAL ACCOUNTING TOOLS IN LATVIAN AGRICULTURE

Riga SOVETSKAYA LATVIA in Russian ("Computational Technology in the Village") 31 Mar 78 p 2

ARKHIPOV, P., candidate in economic sciences, director Information-Computational Center [IVTs], Ministry of Agriculture, Latvian SSR, and ALESOVA, M., head of the IVTs staff

[Text] A unified system and methodology of machine processing of accounting data of agricultural enterprises has been developed in our republic. During the years from 1970 to 1977, the IVTs of the Ministry of Agriculture, Latvian SSR, introduced comprehensive mechanization of bookkeeping in 253 kolkhozes and sovkhozes [Soviet state farms].

The direct effect of this innovation was the reduction during the years 1973-77, for Republic sovkhozes alone, of 350 staff units of accounting-bookkeeping personnel with an annual wage budget of 352 thousand rubles. The farm bookkeepers, freed from technical work, intensified inspection of the content of source documents and began systematically to conduct checks of the reliability of accounting data. Efficiency and completeness of bookkeeping information increased. The number of violations of accounting and financial discipline in the republic dropped significantly, and the basic and circulating capital of the kolkhozes and sovkhozes are utilized more efficiently.

It is intended to introduce comprehensive machine accounting in all agricultural enterprises of the republic by the end of the Five-Year Plan. Further refinement of this system is related to the development of the "OASU-Sel'khoz" [Industrial Automated Management System--Agriculture] and changeover to the processing of primary accounting data by means of electronic computers [EVM]. On a second level of priority, the "OASU-Sel'khoz" of Latvia, together with other subsystems, is planning a "Bookkeeping and Accounting" subsystem for kolkhozes and sovkhozes. It will comprise 13 tasks encompassing all aspects of bookkeeping.

For applications of automated processing of accounting data associated with large-scale farming operations, a system of documents is being developed for studying the peculiarities of agricultural production and the possibilities arising only when data are processed by EVM. This will lead to a reduction of the amount of data in source documents and of primary accounting methods. The system of documents will be standardized and will be obligatory for all agricultural enterprises using EVM. This work on the standardization of accounting source documents is headed by the All-Union Scientific-Research Institute of Cybernetics, Ministry of Agriculture, USSR. Automated bookkeeping produces a large amount of information for bookkeeping and accounting purposes and also for subsequent use of the accumulated data.

The "OASU-Sel'khoz" is planning to use EVM of a unified system (EVM YeS) for the automated processing of accounting data and other information. The first of the subsystem applications, "Accounting for Truck Transport," has already been prepared for industrial use. Applications on "Accounting for Machine and Tractor Parts and Work Performed by Horses and Manual Labor" and "Summary Accounting of Labor and Wages" are being prepared for experimental use.

A preliminary calculation of the economic effectiveness achieved by the three applications mentioned above showed that their introduction should achieve a reduction of labor costs in agricultural enterprises of 1.1 thousand man-days (as compared with the use of accounting machines). General introduction of these applications in the entire republic will lead to the freeing-up of more than 3 thousand workers.

Accounting is one of the operative levers of management. Its methodical and organized refinement is an integral part of the measures whose ultimate goal is the systematic and steady rise of agricultural production.

USSR

AUTOMATED MANAGEMENT SYSTEM FOR WATER STORAGE

Moscow PRAVDA in Russian ("Electronics Controls") 11 Apr 78 p 2

[Text] Vil'nyus, 10 April--"ASU-vodokanal", an automated management system for water supply, has begun to function in Lithuania. It is based on the computer center owned by the republic's Ministry of the Communal Economy and equipped with third-generation computers. The ASU regulates the work mode of all the water pumping stations. It also keeps account of water consumption by the populace and industry.

USSR

THE "ELECTROIMPLEX" TRADEMARK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 27 Dec 77 p 4

SNETKOVA, V., Master of sport

[Abstract] A contract has been written for the supply of a number of information displays for the 1980 Olympics by the Hungarian Foreign Trade Association "Electroimpex." The leader of the group of Hungarian engineers, designer Laslo Balash, describes the computer system to be supplied, which will allow correspondence in the press center to observe the results of olympic events in all the olympic arenas on monochrome and color displays. All of the displays will be connected to a central computer which can output up to 60 thousand characters per minute, and will be capable of displaying not only alpha/numeric information, but also still pictures of important moments in the sports events being covered.

USSR

"PREP DEPARTMENT" SUBSYSTEM

Moscow VESTNIK VYSSHEY SHKOLY in Russian No 1, Jan 78 pp 28-30

RESHETNIKOV, V. N. and SOKOLIKHIN, A. N., candidates in physico-mathematical sciences, Moscow State University

[Abstract] This article describes the AISLO [automated information subsystem "Preparatory Division"] utilized by the Preparatory Division of Moscow State University to process the documents of incoming students,maintain records concerning student progress during the year of prep school and to finalize records for students completing the school. For processing of documents in AISLO a "Minsk-32" computer in COBOL is used; all series-produced "Minsk-32" computers, as well as machines of the unified system of computers, are equipped with COBOL translators. Thus, this system can be run on any of these machines. The three sections of the system, for reception, grading and record keeping, and finalization of student documents, are briefly described. A statistical analysis is presented of the grades earned by students as a function of their age, and it is found that the most successful students are those 20 years of age. Tables 1.

USSR

COMPUTER SUPPORT FOR 'OLYMPIAD-80' DISCUSSED

Moscow PRAVDA in Russian ["Electronics Being Readied for the Start"] 8 Feb 78 p 6

LEBEDEV, L.

[Text] The first Olympic facility to begin construction in Moscow was the experimental assembly proving building of the Ministry of Instrument Making, Means of Automation and Control Systems. All the technical devices for developing the Olympiad's ASU are already installed here. The abbreviation ASU can now be deciphered by any upperclassman--it expands to automated management system. However, what connection does it have with the Olympic Games?

"It is not even possible to imagine how in our times we could conduct the Olympic Games without the assistance of computing devices," says V. Polishuk, the head of technical management for the Organization Committee of Olympiad-80. "I shall name three primary tasks for which technology will offer a solution in Moscow. First, these facilities must assume information handling responsibilities for members of the press, specialists and all those who require timely sports information. Secondly, to assist the judges. And besides that, the decision process for a number of questions concerning the preparations for the Games is being automated.

"The Olympiad ASU complex consists of three systems--Information ASU, Competition ASU and Organization Committee ASU. Their developer is the Minpribor SSSR [Ministry of Instrument Making, Automation Equipment, and Control Systems, USSR]. The technical facilities for the last two ennumerated systems are from domestic production. The Information ASU system is being developed jointly with the American firm IBM."

[Question] With a similar system, journalists have already been able to deal with several previous Olympics, for example in Montreal. Every morning we received a lengthy data sheet. I recall that the computer technology even obligingly answered our questions. Thus, upon completion of the Games, in answer to a query by a PRAVDA correspondent, "Electronic Information" produced the entire list of world and Olympic records set during the competition in Montreal. What contributions will be made by the Olympiad ASU in Moscow?

[Answer] First of all, I would like to note that extensive use of the experience gained from similar technology at the Munich and Montreal Olympics has been used in its creation. However, the capabilities of our ASU will be broader and its technology will be significantly more efficient. It will be able to output information not only in English and French like its predecessor in Montreal, but also in Russian. In compiling the computer

programming support, changes in the contest rules are being taken into consideration, even in the case where five disciplines have been added to the Moscow Olympic's schedule. We mean to give out more information on the participants, the records and the medals. And of course each day we intend to prepare special information sheets like the one in Montreal, as well as a running account of the competitions. And on the final day of battle, a book with the results for this or the other athletic category will be promptly issued. The ASU will also be capable of "giving an interview." Upon request it will submit information on the progress of the battle for any of the competitive games of the 22nd Olympiad.

[Question] Last year, when V. Yashchenko set the world high jump record, he was still a little-known athlete, but he was immediately subjected to " "attack" by journalists who wanted to describe the record-breaking performance in greater detail for their readers. The Olympics introduce many new names....

[Answer] I understand what your are asking. During Olympiad-80, the electronic "memory" will store a great deal of information on each participant--age, height, weight, previous meet results, personal records, marital status, and even interests. In addition, by the start of the Games, books on the competitors will have been published by the ASU system for all athletic categories.

[Question] But how will this computer technology help the judges?

[Answer] The Competition ASU will begin working for them. For example, it will be entrusted with issuing judicial documentation, it will assist arbitrators in pairing up fencers, during basketball matches it will keep track of the baskets scored and so forth. We also want to try to set up this system for television so that the producer can show his viewers, let's say, the standings of the competitors after their second attempt in a jumping event.

[Question] You mentioned that electronics are capable of assisting in the solution of problems connected with preparations for the Olympics.

[Answer] While everything we have been discussing pertains to the future, ASU is included even now in the preparations for the Games. In the very near future, it will begin keeping track of much of what comes under the preparatory activity of the Organization Committee, including the creation of a technical base for the Games and financial questions, and it will be able to resolve a number of other tasks.

[Question] I would be interested in knowing how the creation of the Olympiad's ASU is advancing.

[Answer] At full speed. At the present time, the basic design decisions are undergoing approval at the experimental assembly proving facility. The

construction of the ASU building will be completed this year on the banks of the Luzhnikovskiy. During the second half of the year, installation work will be underway here.

[Question] A final question--what will this ASU be committed to after the Olympic Games?

[Answer] Solving a number of automation problems for the control of Moscow's municipal services. However, the system will not completely abandon its "athletic specialty." It will simultaneously assist in conducting major competitions and will allow automated retrieval of various types of information for the USSR Sport Committee. In general, work will be found for the ASU.

III. SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS

A. Philosophical and Legal Problems

USSR

DEPARTMENT FOR LEGAL PROBLEMS OF MANAGEMENT ORGANIZED

Moscow VESTNIK AKADEMII NAUK SSSR in Russian ("Scientific-Organizational Resolutions Of The Presidium Of The Academy of Sciences USSR") No 1, 1978 pp 158-159

[Abstract] The Department For Legal Problems of Management (Otdel Pravovykh Problem Upravleniya) has been established at the Institute of Economics and Organization of Industrial Production, Siberian Department of the Academy of Sciences USSR, at Tomsk. The department will be concerned with such issues as the improvement of legal methods for resolving economic problems for appropriate territories, merging branch and territorial principles of management, and elaboration of problems or organizational and legal support for automated management systems. The Institute of Government and Law of the Academy of Sciences, USSR, will be responsible for the scientific-methodological management of the new department.

B. Human Factors Engineering and Man-Machine Systems

USSR

MAN-MACHINE INTERFACE DISCUSSED

PROMYSHLENNOST' BELORUSSII in Russian ("Both Man and Machine") No 1, Jan 78 pp 25-26

KANTYLEV, YE., engineer

[Text] There was a time when in both science and in the popular press a lively controversy ensued over the subject, "man or machine?" However, it rather quickly became clear that it was impossible to pose such a question. There is now another problem--"man and machine"--which infers their interaction within a single system.

Among such complex man-machine combinations is also the automated system for technological preparation for manufacturing (AS TPP), being developed under the leadership of G. K. Goranskiy, corresponding member of the Academy of Sciences, Belorussian SSR.

If we examine it in perspective, AS TPP is a complex cybernetic system consisting of 20-25 subsystems which encompass all aspects of industrial planning in the plant. The initial phase of AS TPP is already being introduced into the planning sphere: subsystem for planning of individual industrial processes (brief designation: "Indprotsess"); planning for standard industrial processes ("Tipprotsess"); planning for technology and equipment in cold sheet pressing ("Shtampovka"); designing equipment ("Prisposobleniye") and cutters ("Instrument"); and planning for industrial processes in manufacturing components on automatic machines ("Avtomat"). In the future, planning subsystems for the industrial processes of welding, facing, forging and other forms of component manufacturing will be coming on line.

All AS TPP subsystems can operate both autonomously and as part of a complex system, complementing one another and supplying essential data.

Data in AS TPP flows along the communications channel "process engineer--computer [EVM] --planning objective (industrial process)". The reliability of its operation depends essentially on the "EVM--planning objective" link in which only industrial devices are operating. The "process engineer--EVM" link is firmly tied not so much by an engineering concept, but by common sense.

What is common sense? Normally the customary concepts of judgment and comprehension fall within its scope. Consequently, from the standpoint of common sense one can comprehend and see only that which lies within the scope of man's cumulative experience. In any case, at the beginning of its journey cybernetics almost forcibly extended the scope of common sense which was being created by EVM.

And now the computer, in turn, is forcing meditation over questions of who, why and how it is to be used. Inasmuch as experience in this area remains rather sparse, we must ask for assistance from science which is capable of achieving to its very essence the interrelation between man and machine--the psychology of engineering. The crux of the issue is that the time has come seriously to study and to plan the activity of the operator--processing engineer in AS TPP. However, wouldn't it be easier to use the results of studying the work of the man--operator in automated management systems, let's say, in ASUP [automated production management system]?

In order to answer this question, we must understand what is common between ASU [automated management system] and AS TPP, and what the difference is between these systems. Several versions of ASU are well known. With the assistance of computers one can control power installations, data collation devices (condition monitoring), central controller services, enterprises, and industrial processes (ASU TP).

The fact is that AS TPP is not ASUP. Nor is a portion of it a subsystem as is sometimes thought at plants only because EVM is used in both systems. Such a subordination can exist only in a situation where within ASUP individual planning tasks are automatically resolved. We are really talking about a system in which there is a permanent interface between the production engineer and EVM.

In AS TPP, the planning process is mathematically modeled, but not the activity of the production engineer. The system only takes over the resolution of individual tasks which were earlier handled by man. However, the most demanding functions, the performance of which requires quick thinking and creative decisions, remain within the province of the production engineer. In AS TPP, the operator--production engineer, in process planning, initially evaluates the raw data (design details and technical conditions) and encodes it in language understandable to EVM. Then, in its own right, the machine steps in. However, even at this stage it is still under man's control and provides him with the final results for verification. The operator--production engineer proofs the incoming data and resubmits it into the machine. Only after this, within a few minutes will the EVM issue the prepared documentation, for example, an industrial chart for manufacturing components.

Thus, AS TPP has its own "laws". Because of this, when the introduction of the first of these systems has begun, the work of the operator--process engineer requires intense research into the methods and resources of psychology engineering. Only on the basis of this knowledge is it possible in similar systems for both man and machine to work more rationally.

USSR

"SHAMA" WALKING HELICOPTER

Moscow IZVESTIYA in Russian ("Walk, Helicopter") 25 Mar 78 p 3

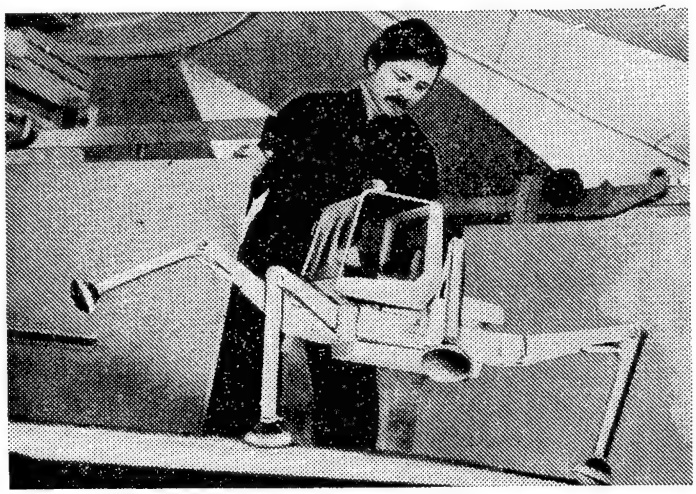
BLOKHNIN, A., Leningrad

[Abstract] Engineers at the Leningrad Institute of Aviation Instrument Making have actually constructed a model of a walking machine in their Robot Laboratory which is headed by M. Zakharov. The model is still not capable of moving its six spider-like legs independently, but laboratory experiments have reputedly shown such movement to be possible in principle. The creature is called "Shama", a name taken from the first syllables of "shagayushchava mashina" or "walking machine."

Electronic systems for control and sensitization of the legs of the machine are being developed which would allow it to detect, for example, that one of its legs is caught in a hole and to take appropriate action.

Another aspect of the problem includes research and development of aviation robot-technical complexes (ARK) by a group of engineers headed by Professor M. Ignat'yev, dr of technical sciences. Examples of ARK are walking undercarriages or telescopic landing attachments. A helicopter outfitted with ARK would be able to land safely on a slope or the pitching deck of a ship.

The photograph shows Zakharov with a model of the "Shama".



USSR

NONRANKED, NONPOSITIONAL REPRESENTATIONS OF NUMBERS FOR ONE CLASS OF SYSTEMS OF BASES

Tbilisi MATEMATICHESKAYA I TEKHNICHESKAYA KIBERNETIKA (Akademiya Nauk Gruzinskoy SSR, Vychislitel'nyy Tsentr, trudy, XV,2) in Russian, 1975, pp 5-11

AKUSHSKIY, I. Ya. and KHATSKEVICH, V. Kh.

[Abstract] An earlier work by the authors introduced certain modifications to nonpositional code in a system of residual classes and proved the existence for each number thus coded of a so-called "expanded normal inverse representation" of 0 rank. Determination of such nonranked representations of numbers, related to the problems of producing special solutions of comparison systems can be best studied for problems of nonpositional machine arithmetics not in general form, but rather on the basis of the specific properties of assigned classes of systems of bases. Using the simplest system of bases with practical application, a section of a natural integer series, the authors generate the normal inverse representation. Equations are presented which allow determination of the canonical spectrum of a number in the system of bases in question. Tables are presented for this determination. Problems of effective utilization of tables of canonical spectra for construction of algorithms for nonpositional machine arithmetic are not discussed. A numerical example is presented. Tables 3, reference: 1 Russian.

USSR UDC 656.25-50

OPTIMIZING THE PARAMETERS OF A DATA TELEPROCESSING SYSTEM

Minsk AVTOMATIKA TELEMEKHANIKA I SVYAZ' in Russian No 3, Mar 77 pp 25-26

VOYNILO, V. V., chief engineer, Computer Center of the Belorussian Railroads

[Abstract] For 3 years already information about all trains on the tracks has been fed directly to a computer memory, bypassing the teletypers as well as the photoelectric counters, so that the frequency of errors is greatly reduced. A statistical analysis and operating experience both indicate that more reliable and faster teleprocessing is best achieved by the use of an external memory with a high-speed access, at any time, to information stored on magnet disks or magnet drums. Such a memory is now coordinated with a MINSK-32 computer, all information storage and retrieval operations having been properly programmed. The system has been organized

so as to allow for easy eventual replacement of the existing apparatus with more modern, second-generation and then third-generation models. Elimination of magnet tape in various processing stages has already contributed to a better quality of information. Tables 2.

USSR UDC 621.394.74

CONSTRUCTION OF SWITCHABLE DATA TRANSFER NETWORK WITH HIGH STRUCTURAL RELIABILITY IN AUTOMATED MANAGEMENT SYSTEM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977, pp 11-15
manuscript received 5 May 76; after completion, 26 May 77

GRAFOV, RUSLAN PROKOF'YEVICH, engineer (Khmel'nitsk)

[Abstract] The paper investigates one of the problems in the construction, according to a specified reliability criterion, of the optimum structure of an information network for a large-scale territorially distributed automated management system [ASU]. A method is proposed for determining the number of data transfer paths connecting a concentration node in a territorily distributed ASU with a data processing center. The model of the problem and the method of solution presented can be used during planning of ASU information networks, e.g., an urban economy ASU where the branch network of an urban telephone service is used as the initial network. Figures 3; references: 3 Russian.

USSR UDC 681.3.48./14

REAL-TIME DISPATCHER FOR MULTIFLOW INFORMATION PROCESSING BASED ON M6000 ELECTRONIC COMPUTER OF INTEGRATED SYSTEM OF COMPUTING TECHNIQUES (ASVT)

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 5, 1977 pp 58-59
manuscript received 16 Mar 77

RUKSHIN, ALEKSANDR GRIGOR'YEVICH, engineer, "Sebzapmontazhavtomatika" Trest [?Northwest Automatic Machine Installation Trust] (Leningrad)

[Abstract] During realization of an automated management system for technological processes [ASUTP], the problem often arises of organizing multiflow information processing, with the object of combining in a single processor computing complex several independent subsystems which use a

single library of standard programs. With the aid of an especially developed dispatcher, such a problem was solved by the creation of the ASUTP equipment ELOU AVT-6 of the Kirishkiy Petroleum Processing Plant. This real-time dispatcher was constructed without allowing for the structure of a specific object and consequently can be used in any system which requires organization of multiflow information processing. The subsystems use a main control system [OUS] and a library of standard programs which occupy approximately 5K words of the main memory instead of 10K words which are required for a real-time operating system [OSRV] and its library. Figures 1; references: 1 Russian.

USSR UDC 681.3.06.62

EXPERIENCE IN DEVELOPMENT AND USE OF SPECIAL DATA BANK

Kiev UPRAVLYAYUSHCHIY SISTEMY I MASHINY in Russian No 5, 1977 pp 59-63
manuscript received 2 May 75; after completion, 30 May 77

BELOUSOVA, YELENA PETROVNA, engineer, OKBA [Experimental Design Office for Automation] (Moscow); GOLOVANOV, OLEG VLADIMIROVICH, dr in technical sciences, OKBA (Moscow); GUBENKO, ALEKSANDR FEDOROVICH, engineer, OKBA (Moscow); YEFANKIN, GRIGORIY ALEKSEYEVICH, candidate in technical sciences, OKBA (Moscow); KUGOYEVA, VITALINA VITAL'YEVNA, engineer, OKBA (Moscow) and SMIRNOV, VLADIMIR NIKOLAYEVICH, engineer, OKBA (Moscow)

[Abstract] The paper describes work with respect to planning and introduction of a sectional data bank [OBD] for maintenance of the business information necessary in the daily activities of the management apparatus of the Ministry of Chemical Industry, USSR. The arrangement of the work takes into account the definite novelty of the problem--the creation of an integrated information system for a special level--and so its special feature as a necessity for a stage of development of the system is not less important. The stage of development of the system requires development of methods of producing and processing information, taking into consideration the nonsimultaneousness of operation of systems for preparation and processing of data. At the first stage there was developed and in 1974 introduced into commercial use, the first information--reference system for a data bank, maintaining the functions of calculation, monitoring and analysis of day-to-day activities of a branch. Development of the system was oriented towards an electronic computer of the third generation and realized by means of the IBM/360 computing complex with a main memory capacity of 384K byte and nine "diskovod" (29 M byte each), three of which are occupied by an operational system and the information management system, IMS/360. The information management system IMS-360--the principal characteristics of

which are explained--forms the basis for the software of the data bank. A block diagram is presented of the process of information processing with the use of a data bank. Figures 1; references 3: 2 Russian, 1 Western.

HUNGARY

PLANNING ASPECTS OF THE DATA TELEPROCESSING SYSTEMS OF THE UNIFIED COMPUTER TECHNOLOGY SYSTEM

Budapest INFORMACIO ELEKTRONIKA in Hungarian Vol 13, No 1, 1978 pp 18-23
manuscript received 22 Apr 77

RET, ANDRAS, department head, TERTA [expansion unknown]

[Abstract] The primary (user) and secondary (software-hardware) system parameters which--together with their interactions--must be taken into consideration in establishing the design criteria for data teleprocessing systems in general, and data teleprocessing systems for the ESZR [Unified Computer Technology System] in particular, are briefly discussed. The primary system parameters include the data-processing needs, the quantitative aspects of the information handled in the system, the forms of the information at the source and the acquisition unit, the topology of the system, the reaction time, the quality of the information, the security of the data, the access to the data, and environmental conditions. The secondary system parameters include the basic software (minimum configuration), supplementary programs, user programs, data-transmission multiplexer, data-transmission devices (including the channels), terminals, and other devices. These parameters must be studied in terms of their interactions. The infrastructural conditions include the computer-technology culture level of the users, the services of the seller, the product quality, the changing speed, the management system, geographic factors, the communications network, and the like. Compromises must be made.

USSR

THE COMPUTER AS LIBRARY

Moscow VESTNIK VYSSHEY SHKOLY in Russian No 1, Jan 78 pp 30-34

IGUMNOVA, N. P., MALKIN, I. V. and TSYGANOV, V. G., Moscow Institute of Engineering and Physics

[Abstract] The Moscow Institute of Engineering and Physics [Moskovskiy in zhenemo-fizicheskiy institut] has been working on the problem of mechanization and automation of library, bibliographic and information processes for a number of years. The system, a component part of the automated management system (ASU) of the institute, includes automation of book lending records, maintenance of waiting lists for publications, statistical analysis of the demands for the literature, maintenance of records concerning availability of publications and other library records-keeping functions. A "Minsk-32" computer is used, and each publication and client of the library have been assigned a number to facilitate record keeping. The operation system is analyzed on the basis of borrowing and return of a book. An example of a machine-oriented catalogue description form is presented. At present, work is continuing to expand the services available to readers. There is discussion of the use of the "Minsk-32" computer with an expanded set of peripheral hardware such as a magnetic drum and CRT display terminals to allow clients to have direct access to the information in the computer. Figures 2.

USSR

INFORMATION-DISPATCHER SERVICE

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian ("Information Dispatcher Service for Computer Centers") 31 Jan 78 p 3

[Text] In the interest of making more effective use of computer technology in participating computer centers and in other organizations in the city of Alma-Ata, the Council of Ministers, Kazakh SSR, has decided to create a division-level information dispatcher service for Alma-Ata city computer centers within the republic's TsSU (Central Statistical Administration). The service will be established in the first quarter of 1978. The decision to establish it was made on the recommendation of the Republic Interdepartmental Council on Issues of Computer Technology and Automated Managements Systems, Gosplan, and TsSU Kazakh SSR. The traffic control information service will be responsible for the following:

to make known the availability of free machine time at computer centers and other organizations, enterprises and foundations, operating computers in Alma-Ata, as well as the use of their algorithms and programs;

the determination of the requirements of enterprises, organizations and institutions in data processing-computing operations with the use of computers.

the organization of the use of free machine time of electronic computers with operational redistribution of it for information processing during peak loads.

It is recommended to ministries and interdepartmental organs having computer centers and separate electronic computers at the enterprises under their jurisdiction that the TsSU Kazakh SSR be presented with the data necessary for the implementation of measures entrusted to the information dispatcher service.

USSR

AVTOMETRIYA DEVOTES ENTIRE ISSUE TO OPTICO-ELECTRICAL DATA PROCESSING

Novosibirsk AVTOMETRIYA in Russian No 1, Jan/Feb 78 pp 3, 133-136

[Editorial and abstracts from issue of Avtometriya]

[Text] From the Editor

The need to create data memory and processing systems having new qualities in both memory capacity and dynamics is obvious. The increasing complexity of traditional microelectronic circuitry has compelled researchers to turn to optical communications links and new physical principles of memory. To create optico-electronic systems for parallel processing of digital data which are competitive (in the basic parameters) with similarly organized IC circuits, a series of basic problems in physics, technique and technology must be solved. Specialized thematic issues of the journal "Avtometriya" are aimed at reflecting the state-of-the-art in physical research and development in this new, rapidly expanding field both here and abroad.

The material presented in this thematic issue does not, of course, pretend to exhaust the problem entirely. We do hope, however, that this collection will aid in presenting interested readers with the range of problems and topics in research which should aid in realizing the computers of future generations.

UDC 548.0:537.226.33:681.325:621.378

Optical memory, principles of recording, and materials utilized (review)
KOBAYASI, Dž̄h. and UYEZU, Yu, pp 4-15

Optical memory has many notable advantages, among these are its high data capacity, which can not be achieved using traditional methods of memory. This review is written to aid experts evaluate the modern state of development in optical memory media. Particular emphasis is placed on ferroelectric materials. The optical activity effect may be utilized in optical memory. Figures 5; tables 1; references 60: 6 Russian; 54 Western.

UDC 537.226.33

Optical recording of data and aspects of light diffraction in photorefractive crystals
KAMSHILIN, A. A., PETROV, M. P., STEPANOV, S. I., and KHOMENKO, A. V. pp 16-26

The theoretical and experimental aspects of recording and sensing of diffraction grids in electrooptical crystals are examined. The effect of double refraction is considered in detail and the familiar Kohelnik formula is generalized. The resolution of PROM devices is analyzed. Calculations and experiments agree well. Figures 11; references 14: 7 Russian, 7 Western.

UDC 537.226:535.21

Experimental research on conductivity and photo-induced double refraction in lithium niobate crystals
KANAYEV, I. F., MALINOVSKIY, V. K., and STURMAN, B. I., pp 26-29

The conductivity of $LiNbO_3$ crystals in optical memories is experimentally studied. It is shown that photo-conductivity plays no particular role in shaping distortions of the index of refraction. Figures 3; references 7: 3 Russian; 4 Western.

UDC 548.0:537.226.33

On some classifications of ferroelectric crystals
NAKAMURA, T., pp 29-39

The number of ferroelectric materials studied has grown considerably and more profound investigation of ferroelectric properties has recently led to the appearance of some methods for classifying ferroelectric crystals. But these methods differ greatly among various authors both in terms of definitions of concepts and in the physical grounds for drawing up the classification scheme.

The goal of this paper is to explain the physical basis of existing classifications and the general correlations existing between them. This must be done to avoid potential misunderstandings. Tables 2; references 36: 5 Russian, 31 Western.

UDC 535.215.12

The photo-Hall-effect in crystals not having a center of symmetry
BELINICHER, V. I., pp 39-46

The effect of the magnetic field on the photogalvanic effect is computed: the occurrence of current in a homogeneous crystal without a center of symmetry under the influence of homogeneous illumination. The magnetic field generates an additional component in current which alters the sign in conformity with that of the magnetic field. Two components of the photo-Hall-effect are considered: the regular Hall effect and the anomalous Hall effect which is associated with electron spin polarization by the magnetic field. The second component is similar to the effect of electron spin via spin-orbital interaction on the dielectric constant of a ferromagnetic substance: to the anomalous Faraday effect. At high temperatures, the regular Hall components dominates in photoelectric current; at low temperatures, the primary component is associated with electron spin polarization. References 7: 5 Russian; 2 Western.

UDC 535.215.12

Models of extrinsic centers in photogalvanic effect theory
BELINICHER, V. I., and FILONOV, A. N., pp 46-50

A mechanism of asymmetry of ionization and recombination of electrons is suggested which is associated with the mixing of wave functions of opposite parity for an electron in an impurity of crystals without a center of symmetry.

For the case of a Coulomb center of large radius, computations of photoelectric current are carried out neglecting perturbation theory. References 4: 2 Russian, 2 Western.

UDC 548.3:534.01

Acoustico-optical properties of $ABCl_3$ crystals
ALEKSANDROV, K. S., ANISTRATOV, A. T., and BEZNOSIKOV, B. V., pp 50-53

The basic tendencies of changes in optical and acoustico-optical characteristics are analyzed for the family of crystals having the general formula of $ABCl_3$, where A is a monovalent metal and B is a bivalent metal. Coefficients of acoustico-optical quality $M_2 = n^6 p^2 / \rho v^3$ are estimated. It is shown that the quantity M_2 for $TlCdCl_3$, $TlPbCl_3$ and $CsPbCl_3$ crystals

is 21, 27, and 94 x 10^{-18} units CGS and these materials are potentially promising for use in practical acoustico-optical devices. Tables 2; figures 2; references 8: 7 Russian, 1 Western.

UDC 681.325:621.378

On the outlook for optical methods of data processing
BARREKETT, Ye., pp 54-60

A review of the state of methods of data processing is given and the applicability of optical methods in fields where they can play a significant role in the future is analyzed. Various components of automated offices and cases where optical methods may squeeze out current methods are analyzed. Because methods of processing are constantly developing, new devices can not enter the market unless they have significant cost and/or performance advantages. It is concluded that optical methods have a negligible chance of appearing in the memory market until the end of the coming decade. Still, they have real potential for success in communications systems and are fully justified for use in I/O devices. Figures 4; tables 1; references: 39 Western

UDC 666.266.5:772.99

Spectral properties of statistical systems of non-interacting ellipsoid silver particles of small size
ANIKIN, A. A., and MALINOVSKIY, V. K., pp 61-65

The features of absorption spectra are considered for systems of small ($R \lesssim 10$ nm) ellipsoid particles of silver. It is shown that according to the function of spectral distribution it may expand as compared to the spectrum of absorption of spherical particles, move left or right, or have several peaks. The change in optical constants with reduction in particle size leads to a smoothing of the particular features of the spectrum. Results are given of numerical computations of absorption spectra of a system of ellipsoid silver particles in silver chloride. Figures 6; references:7: 1 Russian, 1 German, 5 Western.

UDC 666.266.5:772.99

Spectral studies of silver haloid color photo plates
ANIKIN, A. A., MALINVOSKIY, V. K., TSEKHOMSKIY, V. A., pp 65-71

Experimental research findings on the spectra of additional absorption of color photo plates under different conditions of activation and bleaching are cited. It is found that the kind of additional absorption spectrum (AAS) greatly depends on the wavelength of the dye. In bleaching we find the photoadaptation effect: more rapid decrease in AAS at the bleaching wavelength. The magnitude of dichroism occurring in bleaching with linearly-polarized light indicates considerable anisotropy of dye centers. It was found that dye centers causing absorption in the short-wave and

and long-wave regions of the visible spectrum have less stability. Results of experiments are completely explained within the framework of the ellipsoid model of dye centers. Figures 8; references 10: 6 Russian, 4 Western.

UDC 772.52(088.8)

Production of photographic images on photo layers containing metal carbonyls using the physical developing process
GORUNOV, V. I., YEROSHKIN, V. I., MAKKAYEV, A. M., and FOMENKO, M. G., pp 71-73

The method of obtaining photographic images on photolayers containing light-sensitive metal carbonyls is described. Methods are presented for preparing photolayers on different substrates. Stabilization of the latent image is done by heat treatment of the exposed photolayer. Visible images are produced by developing photolayers in physical developers.

A concrete example of photographic image production is cited. References 5: 3 Russian, 2 Western.

UDC 772.293:77.023.41

Relationship of photographic sensitivity and selectivity of the physical development process as a function of potential difference of the developer
YEROSHKIN, V. I., TROFIMOV, A. S., pp 73-77

The relationship of photographic sensitivity, selectivity and speed of physical developing process as a function of the difference in redox potentials of silver and copper physical developers is studied. It is found that the curve of the dependence of selectivity as a function of the potential difference of developers passes through the maximum. In developing layers containing photolytic centers of the latent image, photographic sensitivity is exponentially dependent on the potential difference of the silver physical developer. Possible causes of different natures of development in silver and copper physical developers are discussed. Figures 5; references 14: 8 Russian, 6 Western.

UDC 539.216.2:537.525.92

Effect of sudden increase in pulsed current in dielectric layers under the effect of strong electrical fields
BAGINSKIY, I. L and KOSTSOV, E. G., pp 78-85

The effect of sudden rises in pulsed current in dielectric layers under the influence of strong electrical fields is discussed. For a description of the effect, a diffusionless model of current of monopolar injection is suggested, considering the field ionization of levels of capture within the specimen. It is shown that experimental results are qualitatively described by this model and do not correspond to the mechanism of maximum filling of traps. Experimental methods are proposed for separating these mechanisms. Figures 8; references 6: 4 Russian, 2 Western.

UDC 539.216.2:557.525.92

Transient currents in a dielectric containing electron capture centers
KOSTSOV, E. G., pp 85-91

The behavior of total current in a dielectric in the presence of deep electron-capture centers is considered. The intensity of the electrical field on the cathode surface is not fixed in time and is determined by the distributive law of charge accumulated through the thickness of the layer. Figures 4; references 3: 2 Russian, 1 Western.

UDC 537.311.4

Injection contact for wide-zone dielectrics
GUDAYEV, O. A., KOSTSOV, E. G., MALINOVSKIY, V. K, pp 92-96

A method of electronic contact is described which permits an easy interpretation of the results of experiments, since it principally excludes the role of one contact barrier. Comparative measurements are made on volt-ampere and lux-ampere curves in the MDM system and using the method of electronic contact in crystals and films of $Bi_{12}GeO_{20}$. It is found that contact phenomena in the MDM system determine the behavior of current and photoelectric current. 4 illustrations, references 7: 6 Russian, 1 Western.

UDC 539.216.2:537.311.33

Electrical and photoelectrical properties of films of bismuth germanate
GUDAYEV, O. A., KOSTSOV, E. G., MALINOVSKIY, V. K., and POKROVSKIY, L. D., pp 96-102

Specifics of producing textured layers of bismuth germanate are considered. The relationship between structure, electrical and photoelectric properties of films and their thickness is investigated. The concentration and depth of bedding of trap centers in the forbidden zone, section of capture, and photoionization of free carriers are estimated. It is shown that electrical and photoelectric properties of films are directly related to their structure; the concentration of trap centers decreases with increasing thickness; an increase in grain size of bismuth germanate ceases at about 0.8-1 micron in thickness. 2 tables, 7 illustrations, references 6: 4 Russian, 2 Western.

UDC 535.813:002.2

Connection between profiles of indices of refraction and kinetics of diffusion of titanium in planar $LiNbO_3$ waveguides
ZILING, K. K., POKROVSKIY, L. D., SHASHKIN, V. V. and SHIPILOVA, D. P., pp 103-108

The patterns of Ti in lithium niobate are studied. The coefficient of diffusion is defined and a connection is established between the concentration of diffusant and the change in ordinary and unusual coefficients of refraction. A relationship is found of the optical characteristics of the waveguide as a function of the parameters of diffusion and conditions of production. Figures 6; references 6: 1 Russian, 5 Western.

UDC 621.396.535.8

Lithium-niobate linear transparency
VOLKOV, V. V., KARASEVA, N. S., LUKASEVICH, L. P., POTAPOV, YE. V., and RAKOV, A. V., pp 108-111

The results of a study of passage of light by a linear transparency made of lithium niobate are presented. Light propagates along the Z axis of the crystal, the field is applied along the X axis. It is shown that the most convenient for practical purposes is an equality of width of control electrodes and the plate width. In this case, for a spacing of control electrode equal to double the thickness of the plate there was no effect of adjacent electrodes on the given control electrode. Figures 4; references: 2 Western.

UDC 535.375.5

Interinstitute Seminar "Problems of Modern Optics and Spectroscopy: Resonant nonlinear optics of gaseous systems"
POPOV, A. K., pp 112-128

A review is given of results obtained in resonant nonlinear conversion of laser emission frequency in gaseous media. Figures 5; tables 1; references 92: 50 Russian, 42 Western.

USSR

SYSTEM FOR AUTOMATED PROCESSING OF MEDICAL DOCUMENTS IN OPERATION AT KAUNAS CLINICAL HOSPITAL

Moscow IZVESTIYA in Russian ("Automation Helps") 8 Apr 78 p 3

[Abstract] A system for automated processing of medical documents which has gone into operation at Kaunas Clinical Hospital serves some thousand people daily, and saves physicians there almost 2 hours per day. The data, written on magnetic tape, needs only to be typed from a sound recording by typists, who then pass it on to the physicians.

VI. THEORETICAL FOUNDATIONS

A. General Problems

USSR

NEW DISCOVERY IN FIELD OF SEMICONDUCTORS

Moscow IZVESTIYA in Russian ["Secret of the Magic Crystal"] 21 Jan 78 p 3

AKHMETOV, R.

[Text] A scientific discovery in the field of crystal chemistry of semiconductors was registered in the State Committee of the Soviet of Ministers of the USSR for Inventions and Discoveries.

This fundamental investigation was conducted by scientists at the Institute of General and Inorganic Chemistry of the USSR Academy of Sciences, at Moscow State University imeni M. V. Lomonosov, at the Moscow Institute of Steel and Alloys and at other scientific establishments of the capital.

One of the main catalysts of scientific and technical progress is electronic technology. In such equipment and apparati semiconductors are the basic unit. These "magic crystals" allow the steady miniaturization of equipment and required power.

The basic materials for semiconductors are silicon and germanium. Like any solid substance, these, under the influence of pressure, temperature or other factors, change their characteristics and structure.

As a result of these fundamental investigations carried out by N. Belov, G. Bokiy, V. Lazarev, V. Shevchenko, N. Smirnova, V. Dvoryankin, Yu. Velikov, A. Al'tshuler, A. Izotov, and G. Umarov, another secret of the "magic crystals" has been revealed. The authors of the discovery have established how, under the influence of temperature, pressure, or a change in the crystal's chemical composition, the characteristics and structure of semiconductors change. They acquire the same high electrical conductivity as a metal possesses.

It is now possible, on the basis of this discovery, to predict how the atoms will redistribute themselves in the new crystalline structure of the substance and what qualities it will possess.

The work of the Soviet scientists provides ample opportunities for the acquiring of semiconductors with designated properties, and for the improvement of technology.

USSR

AUTOMATA WITH A DISTRIBUTED MEMORY

Moscow IZVESTIYA AKADEMII NAUK SSSR, TEKHNICHESKAYA KIBERNETIKA in Russian
No 6, Nov-Dec 77 pp 208-209

LAZAREV, V. G. [Reviewer]

[Review of book "Avtomaty s raspredelennoy pamyat'yu" by V. N. Zakharov, Moscow, Izd-vo Energiya 1975, 134 pages]

[Abstract] The book attempts to reconcile the technologist's language in which performance specifications for an automaton are written and the designer's language according to which an automaton is built. The language in this book is based on sequences, i.e., expressions consisting of two parts connected through some special symbol, both parts generally being Boolean functions. Each sequence essentially formalizes the conventional word sequence of the "if A, then B" kind in a natural language. Much attention is paid to the problem of minimizing sequential descriptions. Two methods of minimization are shown, applicable also to highly indeterminate automata. The approach taken in this book is eminently simple. The last chapters deal with the complexity of sequential descriptions as well as with problems of coding and performance stability. The book is written clearly, for a wide range of specialists engaged in the design of discrete control systems. Its only deficiencies would be the lack of examples illustrating the possible applications of the author's method, which includes sequential description of automata with a distributed memory, and the absence of any comparison between sequences and transition formulas according to V. F. D'yachenko. Nevertheless, the book is a very good one and should serve as a valuable aid in the preliminary design of many different control systems.

USSR

COMPUTERS IN CHESS

Moscow KOMSOMOL'SKAYA PRAVDA in Russian ("Manual of Logic. Electronic Computer: 'Chess'") 17 Dec 77 p 4

KHENKIN, V.

[Abstract] In a discussion of the capabilities of computers for chess playing, the author suggests that the problem be approached by modeling the thinking of a chess master. M. Botvinnik has been working for more than 10 years on the creation of a chess-playing program called "Pioneer". Like a human player, this program ignores stupid moves, and is therefore based on a selection tree of only 100 to 200 junctions, allowing a significant increase in the depth of the search for each move. This is achieved by precisely formulating the purpose of the game. "Pioneer" is an aggressive chess player. Each piece is assigned a target piece, for which an "assault trajectory" is constructed, the length of which is limited by the "horizon," which changes depending on the complexity of the position. The group of such pieces with a common goal forms a "game zone," the second level of the system. Finally, the third level is the "zone set", the mathematical model of the position, dictating the selection of a move, considering all factors. This system is thought to model the thinking of a human chess master.

USSR

ALGEBRAIC METHODS IN THEORETICAL PROGRAMMING STUDIED IN NEW BOOK

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, Nov-Dec 1977 p 124

[Annotation to the book "Algebra. Yazyki. Programmirovaniye" (Algebra, Languages and Programming), second edition revised by V. M. Glushkov, G. Ye. Tseytlin and Ye. L. Yushchenko, Izdatel'stvo Naukova Dumka, Kiev, 1978, 10,000 copies, 20 quires, 10 thousand copies printed, 3 rubles, 32 kopeck]

[Text] Evolution in the field of interaction between man and computers has entailed the creation of large-capacity hardware and software for it, including evolved languages and programming systems. This has enhanced substantially the "intellect" of computers, implemented by both hardware and software methods, and has been conducive to further broadening of the range of application of computer technology. Solution to the problem which have arisen in this has resulted in the origin and development of theoretical programming and in penetration into it of the ideas and methods of general algebra.

This monograph is devoted to a study of algebraic methods and to their application in theoretical and systems programming--to the applied theory of algorithms and to the theory of formal languages and programming systems.

This book is intended for specialists in theoretical programming and in designing computer software systems. This book will also be useful to graduate students and students in VUZ's.

VII. GENERAL INFORMATION

A. Conferences

USSR

INTERPORT-77

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4, Jul/Aug 77 p 19

[Text] The second international exhibition "Interport-77" will be held in Leningrad from September 1 through 11, 1978. It has been organized by the FRG firm Ost-Khandel'-Konsal'ting [name transliterated]with the assistance of the All-Union Chamber of Commerce and Industry USSR.

The exposition will include presentations of electronic control systems, including new computers punch card equipment, high-speed data transmission, systems, sensing devices and media for initial data collection, media for complex automated control, equipment for dispatcher centers, resources for wire and radio communications, equipment for the mechanization and automation of clerical work, etc.

A symposium on the theme of the exhibition will be conducted and a showing of specialized literature will be organized.

USSR

PROBLEMS OF AUTOMATION AND THE USE OF ELECTRONIC COMPUTERS AT THE WORLD ELECTRICAL ENGINEERING CONGRESS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 4, Oct/Nov/Dec 77, p 77

KONONENKO, N. A., engineer

[Text] In June of 1977, the World Electrical Engineering Congress (VELK was held in Moscow, on the initiative of the USSR. Some 2800 specialists from 42 nations of the world took part in the congress.

The plenary sessions heard two reports on the problems of creation and utilization of computers (EVM): "The Future of Microelectronics and Micro-EVM," and "The Present and Future of EVM in Technology." Of 800 reports heard at the congress, over 150 were dedicated to problems related to the automation of management, about half of these reports being made by specialists from the USSR and CEMA member countries.

In two of the eight sections of the congress, problems were analyzed relating to the utilization of computers and microelectronics in management systems; complex electromechanical systems with microprocessors and control computing machines for various branches of industry and transport; automated electric drive and prospective types of electrical equipment; and elements of industrial electric equipment. Particular attention was given to the development of integrated circuits, electronic memory, integrated digital-analog converters and switches, increasing the reliability of electronic devices, and the use of microprocessors and microcomputers.

Problems were also analyzed which are related to the use of specialized electromechanical systems for aircraft and spacecraft, orbital space stations, for magnetically suspended transportation systems, etc. Reports were heard on the architecture and circuit engineering for management of computing complexes, information display systems, problems of software, specialized languages for management systems, and real time operational systems. Problems related to the creation of automated test apparatus using computers, microminiaturization of electronic devices for management systems, increasing the reliability, viability and effectiveness of the operation of computer equipment were analyzed. Reports included "A Method of Construction of a System to Prevent Catastrophic Failure," "Increasing the Reliability of Production Installations by the Use of Regulation Algorithms for Safe Control in Emergency Situations," "Computerized Control of the Connection Circuits in Large Power Systems in Emergency Situations," etc. All reports were published in Russian, English and French.

The VELK was an example of an effective form of communication among scientists of various countries, allowing the exchange of technical ideas and achievement of agreements on various problems of electronic and electrical engineering.

The problems discussed confirm the motto of the VELK--"The Present and Future of Electric Engineering."

USSR

DIGITAL COMPUTER EQUIPMENT-DESIGN-AUTOMATION SYMPOSIUM

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian ("Automation of Digital Computer Equipment Design") No 6, Nov-Dec 77 p 136

KAPLAN, A. V.

[Text] From 31 May to 2 Jun 1977 in Kaunas was held the "Digital Computer Equipment Design Automation" conference, organized by the Home of Engineering

of the Lithuanian SSR Scientific and Technical Societies, the Lithuanian Republic Administration of the Scientific and Technical Society of the Instrument Making Industry imeni S. I. Vavilov, and the Kaunas Polytechnical Institute imeni Antanas Snechkus.

At this conference questions were dealt with relating to theoretical study and practical application of algorithmic methods of designing and testing digital computers, as well as to designing systems for automated design of digital computers.

Taking part in the proceedings of the conference were 135 specialists from various organizations in the USSR. Heard and discussed were 70 papers and reports, published in the collection "Vychislitel'naya tekhnika" [Computer Technology], vol 9.

Touched upon in these reports were questions relating to the construction and implementation of automated systems for designing equipment, to the feasibility of constructing interacting systems, to creating models for studying printed circuit board designs, to constructing layout and assembly algorithms, to calculating switching of components to a specific state, and to the relationship between individual design problems.

Listened to very attentively were papers and reports by leading specialists in the field of design automation. The following papers evoked the most interest: "One Approach to Synthesizing Testing Procedures for High Level Integrated Circuits" (V. F. Zvyagin, O. F. Nemolochnov and A. Ye. Usvyatskiy, Leningrad), "Analytical Evaluation of Layout Results" (G. G. Ryabov, Moscow), "Minimizing the Number of Main Lines in Initial Layout of Connections" (V. A. Selyutin, Leningrad), "Subsystem for Automating Design of Equipment Based on Different-Size Components" (L. B. Abraytis, I.-K.L. Matitskas, B. A. Potsene, A. B. Rishkus, D. A. Rublyauskas and V. Yu. Chiritsa, Kaunas), "Problems in Distributing Invariant Systems" (V. A. Zhilevichyus, K. B. Mishkinis, A. I. Rauduve and A. P. Shimaytis, Kaunas), "Application Program Package of a System for Automating the Structural Design of Hybrid Large-Scale Integrated Circuits" (A. M. Bershadskiy, Penza), "Topological Layout with Rearrangement of Connections" (A. I. Petrenko, A. Ya.Tetel'baum and N. N. Zabaluyev, Kiev), "Complex Models of Flexible Route Topology" (R. P. Bazilevich and O. Z. Yasenitskiy, L'vov), and others.

Participants in the conference noted a number of new trends in development of automated equipment design methods, in particular: combining problems relating to testing and diagnosis with designing printed circuit boards and large-scale integrated circuit topology; expansion of the dimensionality of successfully solved problems; development of flexible layout and other methods involving improvement of key layout parameters; creation of models for designing and studying equipment; etc.

The conference's business environment and its practical orientation and concern with production were conducive to effective functioning on the part

of participants in the conference and made it possible to designate a number of new trends in the field of automating design systems.

USSR

SEMINAR ON COMPUTER NETWORK SYSTEMS SOFTWARE

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 6, Nov-Dec 77 p 137

KUSHNER, E. F. and NIKOLENKO, D. I.

[Text] From 30 Aug through 7 Sep 1977 the Republic Home of Economic and Scientific and Technical Propaganda and the Institute of Cybernetics, Academy of Sciences, UkrSSR, held in Kiev a "Computer Network Systems Software seminar, in whose proceedings took part more than 100 representatives of more than 70 organizations in the country. At this seminar 24 papers were read, prepared by associates of the Institute of Cybernetics, Academy of Sciences, UkrSSR, the Institute of Computer Technology, Academy of Sciences, Latvian SSR, the All-Union Scientific Research Institute of Problems of Systematization and Control, and the USSR TsSU [Central Statistical Board] All-Union State Planning and Technological Institute.

The paper by E. F. Kushner and A. V. Tupchiyenko, "Systematization of Information Software for Automated Management Systems," was devoted to the principles of designing integrated ASU's [automated management systems] for upper-level control units (production association--ministry--Gosplan) and to a description of systems for assembling primary information, a model of which has been created at the Institute of Cybernetics, Academy of Sciences UkrSSR and will be tested in an experimental computer network. I. A. Bazilevich and I. I. Voloskov, in their paper "Architecture of a System for Controlling a Scattered Data Bank (General System for Processing Inquiries for Data)," presented a demonstration of the architecture of a function-oriented scattered data bank based on a computer network and a program for implementing a scattered data bank for integrated ASU's for upper-level control units. An important common trait of both of these papers is the systems approach to solving the problems posed. Treating the IASU [integrated automated management system] and the scattered data bank as a subsystem of the OGAS [All-Union State Automated System for Collection and Processing of Information for Accounting, Planning and Management of the National Economy], the writers of these papers devoted much attention to questions relating to standard links with other OGAS subsystems.

A. P. Chernat in his paper "Development of a Communication Processor for a Package Switching Network" spoke of the software for a communication processor based on the M400 minicomputer, the development of which is under completion at the Institute of Cybernetics, Academy of Sciences, UkrSSR. In papers by S. V. Rotanov and Ye. N. Kaluzhskaya, "Third-Level Procedures in Computer Networks," and D. I. Nikolenko and L. V. Petrukhina, "Control of Information Exchange Between Remote Computers by Means of a 'Transport Station' Software Group," two different approaches were given to controlling exchange of data between remote computers.

I. I. Voloskov, V. V. Gusev and V. L. Ozirnyy devoted their paper "Some Software for Implementing the Computing Process at Computer Centers" to the YeS rapid restart operating system, to a set of catalogued procedures for software developers, and to an editor for servicing character libraries. The proven savings from introducing this software in only one YeS-1030 computer has been about 40 thousand rubles per year (because of savings of machine time). B. N. Pan'shin told the audience at the seminar about a software system for registering and planning the workload of a single computer, an individual computer center, and a group of computer centers, in his paper "The Structure and Distinctive Organization Features of the Information Software of a Regional Central Information Control Service." The system described by this writer has been put into service and has won a good recommendation for planning the work-load of a regional computing center (the central information control station in Kiev) and for organizing machine time for VUZ students (Kuban University). In a paper by Yu. N. Cherkasov, V. P. Gurzhiy and Ya. P. Doriy, "Intercenter Data Exchange Test Zone," the results were given of experiments on sending data long distances through switchable telephone lines.

The exchange of ideas on the questions discussed proved useful both for developers and for those interested in implementing software for ASU's, ASUP's [automated enterprise management system], and ASUTP's [automated management system for technological processes]. The participants in the seminar decided to hold seminars like this every year. The theses of the papers presented have been published. It has been suggested that the most interesting of them be published in UPRAVLYAYUSHCHIYE SISTEMY I MASHINY, as well as in the collection being readied for publication entitled "Questions Relating to Designing Computer Networks and Multiple User Computer Centers."

USSR

COMPUTER SOFTWARE SEMINAR

Kiev VISNYK AKADEMIYI NAUK UKRAYINS'KOYI RSR in Ukrainian No 2, 1978
pp 100-101

KIRO, S. M. and BIRYUKOVA, T. L.

[Text] The Computer Mathematics Seminar organized by the Department of Computer Mathematics of Odessa State University marked its tenth anniversary.

Almost 60 scientists participate in the work of the seminar. In 10 years 109 conferences have been held and 145 papers and reports have been given, speakers have come from Odessa State University, Odessa Polytechnic, Engineering-Construction, and Pedagogic Institutes; Zaporozhets Mechanical Engineering Institute, Kramatorsk Industrial Institute, Izhevsk Mechanical Institute, and other vuzes, the Kharchpromavtomatika All-Union Scientific Production Association (Odessa), Dnepropetrovsk Division of the Institute of Mechanics of the UkSSR Academy of Sciences, and other organizations. An important goal of the seminar is the coordination of work in computer mathematics at the above institutes and several others.

The main goal in the work of the seminar is to approximate the solution of differential equations, ordinary and partial differential equations, as applied to some problems of hydrodynamics, gas dynamics, elasticity theory, theory of thermal conductivity,and optimum control theory.

The participants paid much attention to general issues of approximate solutions to differential equations, research findings on problems in gas dynamics and hydrodynamics, questions of thermal conductivity theory, study on some problems of elasticity theory including theory of plates and various problems of optimum control.

Scientific contacts with leading institutes in computer mathematics and its application were established and expanded during the seminar, primarily with the Institute of Cybernetics of the UkSSR AS, Moscow and Kiev State Universities. Familiarization with new trends in computer mathematics and expansion of themes of the seminar were provided by reports read by several representatives of Kiev and Moscow scientific schools.

The seminar was begun by organizers of the First Mathematics School on issues of accuracy and efficiency of computer algorithms (Odessa, Sep 69). The school's themes were of great value in developing mathematical foundations for solving a wide variety of scientific and technical problems by selecting the optimum methods according to the most applicable criteria. Later the school seminars on optimization of computations were held regularly by the Institute of Cybernetics of the UkSSR AS. Seminar attendees were attracted to them.

Seminar participants took part in All-Union meetings, seminars, and conferences. Seminar attendees were participants of the Third and Fourth All-Union Congresses on Theoretical and Applied Mechanics (Moscow, 68; Kiev, 76); 8th International Congress on History of Science (Moscow, 71), and the Third Convention of Bulgarian Mathematicians (Varna, 72).

The scientific findings discussed at the seminars were described in books by V. I. Nebenov, V. O. Plotnikov, A. Ya. Kuzyushin "Optimum control of VRSh in agitation" (Moscow 1974), V. I. Nebesnov's "Optimum operating conditions of marine complexes" (Moscow 1974), and also publications of G. L. Mogilevs'kiyi, V. P. Churashova "Approximate computation of multiple integrals using small computers" (Odessa 1975), O. I. Tretyak's "Applied solution of some problems of optimum control described by systems of ordinary differential equations" (Kiev, Institute of Cybernetics 1974).

Two volumes from the work of the Computer Mathematics Seminar have been published (1973, 1975), containing 32 of the papers by its participants.

The activity of the Scientific Council on the Problem of Cybernetics is expanding from year to year. A branch of the Council has already been created in Odessa, at the Southern Scientific Center of the UkSSR AS. The seminar has become part of this section since June 1977. Seminar participants are devoting their efforts to improve the quality and efficiency of work, to expand and deepen its themes, and to attract even more experts from the appropriate organizations to its work.

USSR

TALLIN INTERNATIONAL SYMPOSIUM DISCUSSES PROBLEMS IN CYBERNETICS

Dushanbe KOMMUNIST TADZHIKSTANA in Russian ("The Country of the Soviets--Daily News") 2 Feb 78 p 2

[Text] Tallin--Urgent problems in cybernetics are being discussed at the International Symposium, recently opened in Tallin and organized by the USSR National Committee on Theoretical and Applied Mechanics.

In addition to Soviet scientists, representatives from Great Britain, France, Czechoslovakia, Japan, and other countries are taking part in the symposium.

USSR

MINICOMPUTER CONFERENCE HELD IN ABOVYAN

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian ("Abovyan-77") No 3, 1978 p 63

VAL'DENBERG, Yu. S. and KUPERSHMIDT, Ya. A., candidates in technical sciences

[Text] "Abovyan-77" is the name of a conference that was held in the Armenian city of Abovyan in October 1977. The conference was organized by the Leningrad Scientific Production Association [NPO], "Svetlana," and was devoted to the development, manufacture, and application of a series of microprocessors and minicomputers, "Elektronika S5."

The members of NPO Svetlana presented four reports to those participating in the conference on the technical aspects and future development of two current representatives of the "Elektronika S5" series--the "Elektronika S5-01" minicomputer and the "Elektronika S5-11" microprocessor. Both microelectronic instruments have a single element base (P-MOS structure) made up of a general set of large integrated circuits (IC) and use universal software. The "Elektronika S5-11" microprocessor has less storage capacity and a smaller number of inputs-outputs than the Elektronika S5-01 minicomputer. It also lacks a built-in power supply, is configured on a single printed circuit board, and conveniently fits various automation devices.

Both microcomputers boast permanent storage units, which maintain programs despite breaks or surges in power. The Svetlana Association intends to develop and manufacture the permanent storage units with individual orders (if there is certainty in an adequate number of issues). The existence of software for simulating the operational programs of the "Elektronika S5" on most types of universal electronic computers makes it possible to solve the problems of producing the permanent storage units even without physical simulation on the minicomputer.

The slow speed of the element base of the printed circuit board--10,000 operations per second--limits the range of applications of these devices.

Further work in the development of the"Elektronika S5" minicomputer series lies in the area of modifying the old element base, and using n-MOS structures that increase speed by no less than an order of magnitude.

Two reports, presented by employees of the Leningrad mechanics and polytechnical institutes, dealt with the growth of work on "Elektronika S5" software. The general director of the Association discussed the planning of production for the "Elektronika S5-11" microprocessors.

More than 20 reports, presented by representatives of enterprises of various departments, concentrated on the practical applications of the "Elektronika

S5" minicomputers as automation, remote control, and communications hardware. Among the uses cited were remote control systems, telephone switchboards, automatic PBX's, telegraphic equipment, spectral analyzers, biotechnical systems, cardiogram analyzers, encephalogram classifiers, chromatographs, drafting equipment, aeronautic test equipment, digital controls, photosetters, gauges, electric power equipment controls, premixers, flowmeters, automated navigation devices, and so on.

Some features common to all equipment with built-in microprocessors or minicomputers are their greater functional capabilities; programmed versus mechanical solutions; reduction in components requiring special manufacture and as a result a reduction in production labor input. Here the success of the whole endeavor depends to a great extent on increasing the reliability and speed of the minicomputers produced by the Svetlana Association, and in creating additional modifications with a greater variety of permanent and temporary storage capacities.

Speakers at the conference stressed that in addition to permanent and temporary storage, minicomputers should be equipped with semipermanent (reprogrammable) storage. This would make it possible to create unalterable programs even while the low production run of the equipment with built-in microprocessors makes the special development of a permanent storage unit inefficient. It also makes sense to use semipermanent storage to retain constants that define characteristics of separate modifications in equipment having standardized permanent storage units.

Several of the devices with built-in microprocessors, discussed in the reports, were on display during the conference.

In its final resolution the conference took note of the future promise in developing and applying the "Elektronika S5" family of minicomputers; recommended ways to improve and expand their areas of application; stressed the necessity of increasing the reliability of the processors, and requested the appropriate agencies to solve the problem of insuring series production of a set of software for the minicomputer: primarily videoterminals, cassette storage on magnetic tapes and flexible discs.

USSR

COMMITTEE ON SYSTEMS ANALYSIS

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian ("Control and Progress in the USSR") No 11, 1977 pp 5-17

[Abstract] The Committee on Systems Analysis under the Presidium of the Academy of Sciences USSR is helping to coordinate research in the field of systems analysis. It also promotes the development of international ties for Soviet specialists, primarily via the International Institute of Applied Systems Analysis in Vienna.

C. Personalities

USSR

V. G. DULOV NAMED DIRECTOR OF COMPUTER CENTER

Moscow VESTNIK AKADEMII NAUK SSSR in Russian ("Scientific-Organizational Resolutions of the Presidium Of The USSR Academy of Sciences") No 1, 1978 pp 158-159

[Abstract] In a series of announcements concerning organizational changes in the Academy of Sciences, USSR, it was noted that Doctor of Physical-Mathematical Sciences V. G. Dulov has been named as Director of the Computer Center at the Academy's Siberian Department in Krasnoyarsk.

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